

BULLETIN OF MISCELLANEOUS INFORMATION

No. 7 1938

ROYAL BOTANIC GARDENS, KEW

XLIII—ALCHEMILLAE NOVAE. W. ROTHMALER.

Aphanes andicola Rothm., sp. nov.

Planta annua, parva, 5–10 mm. alta, paulum ramosa, caulibus glabrescentibus, internodiis brevissimis. *Folia* sessilia, dense imbricata, basi angustata, cum stipulis connata, margine longe ciliata, 3-lobata, lobis lanceolatis obtusis, lobo mediano trifido vel 5-lobato, lobis lateralibus integris. *Stipulae* herbaceae, bifidae, margine longe ciliatae, lobis lanceolatis obtusis. *Flores* 4–6, in stipularum axillis glomerulati, stipulas multo superantes, breviter pedicellati, 1.5–1.75 mm. longi, .75 mm. lati, clausi, hypanthio ovato brunneo 4-costato, costis pilis longioribus obsitis, intervallis puberulis granulosisque; sepala 4-nervata, pilosa, apice pilo longiore obsita, triangularia, episepalis nullis. *Stamen* unicum. *Stylus* unicus, brevis. *Semen* acutum, basi excepta margine hyalino circumdeditum, facie granulosa.

PERUVIA: in pascuis alpinis inter Pisio et Ayacucho loco "Minas de plata de Sta. Inés," 4300–4400 m., fl. maio, 1910, Weberbauer 5454 (in Herb. Berol.).

Aphanes Berteroana Rothm., sp. nov.—*Alchemilla Berteroana* Briq. in sched.; ab omnibus affinibus indumento sericeo, foliorum hypanthiique forma differt.

Planta annua, 3–5 cm. (raro 10 cm. vel ultra, vide f. *vegetam*) alta, a basi paulum ramosa, caulibus rigidis erectis dense adpresse pilosis, internodiis sat elongatis. *Folia* plerumque subsessilia, 2–3 mm. longa et lata, e basi lata flabelliformia, vix ad mediam laminam incisa, 3-lobata, utrinque ut planta tota subsericea, lobis integris vel apice 2–3-dentatis, lobulis late lanceolatis obtusis. *Stipulae* 1–2 mm. longae, 2–3-fidae, utrinque subsericeae, dentibus obtusiusculis, cauli adpressae. *Flores* 6–9 in stipularum axillis glomerulati, stipulas superantes, sat longe pedicellati, 1.5–1.75 mm. longi, usque ad 1 mm. lati, hypanthio globoso pilis adpressis dense sericeo; sepala 0.5 mm. longa, paulum conniventia, glabrescentia, margine ac apice hirsuta, lanceolata, episepalis 4 minutis usque ad $\frac{1}{4}$ longitudinis sepalorum attingentibus vel raro partim deficientibus lineari-lanceolatis apice longe ciliatis barbatisve. *Stamen* unicum. *Stylus* unicus. *Semen* acutum.

Forma **vegeta**, f. nov., caulibus longioribus flexuosis, foliis usque ad 7 mm. longis latisque, stipulis 4–5 mm. longis 4–5-dentatis, indumento laxiore differt.

CHILE: in arenosis saxosisque secus torrentem Tagua-tagua, Bertero 31, typus in Herb. Genev. (f. *aprica* et f. *vegeta*); ad rupes in pascuis collium loco "La Punta de Cortes," Rancagua, Bertero 32, in Herb. Vindob. (f. *aprica*).

Aphanes pentamera Rothm., sp. nov.; ab *A. australiana* Rothm.* ceterisque affinibus sepalorum numero quinque nec quatuor, characteribusque multis differt.

Planta annua, gracilis, 3–7 cm. alta, a basi ramosa, caulibus adscendentibus pilis flexuosis patentibus longis dense vestitis, internodiis elongatis. *Folia* longe petiolata, petiolis 3–4 mm. longis, basi cuneata, flabelliformia, margine longe ciliata, 6 mm. longa, 9 mm. lata, fere usque ad basin triloba, lobo mediano trifido, lobis lateralibus 2–3-fidis, lobulis integris vel dentibus 2 lanceolatis acutiusculis praeditis, supra sparse longe pilosa, subtus secus nervum longe ciliato-pilosa, mesophyllo glabro. *Stipulae* herbaceae, connatae et petiolo adnatae, 2–3 mm. longae, ad dimidium usque 4–5-fidae, lobis lanceolatis acutiusculis, foliorum indumento. *Flores* 6–8 in stipularum axillis glomerulati, stipulas superantes, breviter pedicellati, 2 mm. longi, aperti, hypanthio ovato brunneo basi rotundato 10-costato 1.25 mm. longo, intervallis pilis patentibus dense hirsutis; sepala 5, margine et nervo longe ciliata, 0.75 longa, lanceolata, e basi angustata acuta, episepalis 0–5 brevissimis. *Stamen* unicum. *Stylus* unicus.

AUSTRALIA: Prov. Victoria; Distr. Lowan, Jankard's Water-hole, 2 Dec. 1897, J. M. Reader (Herb. South Yarra, Australia).

Lachemilla arborescens Rothm., sp. nov. (sect. *Aphanoides*, subsect. *Nivales*): species insignis non confundenda, fruticosa, unica sectionis atque maxima generis.

Frutex 1 m. altus, caulibus erectis apice ramosissimis cortice papyraceo obtectis, ramis 1–6 cm. longis dense foliosis $\pm$ adpresse pilosis. *Folia* (*radicalia* non vidi) *ramalia* cum stipulis conformibus connata, vaginas amplexicaules, infundibuliformes, apice laciniatas formantia, laciniis 7 aequalibus 3–5 mm. longis 0.5–0.75 mm. latis lineari-lanceolatis margine revolutis cauli laxè adpressis utrinque dense adpresse hirsutis. *Flores* in glomerulos apicem ramulorum superiorum versus aggregati, 4 mm. longi, aperti, extra hirsuti, hypanthio campanulato; sepala 4, late ovato-lanceolata, 1.5 mm. longa, episepalis 4 paulo brevioribus multo angustioribus lanceolatis. *Stamina* duo, longa, $\frac{1}{2}$ longit. sepalorum attingentia. *Stylus* 1 (raro 2), longus, stigmatè globoso.

COLOMBIA: Sa. Nevada de Sta. Marta, Paramo inter Simindenéná et Adurimeiná, circiter 3600 m. alt., copiose, fl. martio, 1928, A. Schultze 1317 (Herb. Berol.).

* **Aphanes australiana** Rothm., comb. nov.—*Alchemilla australiana* Rothm. in Fedde, Rep. Sp. Nov. 38, 42 (1935).

Lachemilla Trevirani Rothm., nom. nov.—*Alchemilla galioides* Treviranus in Bot. Zeit. 7, 215 (1849), non Benth. (1844) (sect. *Aphanoides*, subsect. *Subnivales*).

Descr. emend.: Flos 4 mm. longus, extra sericeus, hypanthio globoso intus piloso 2.5 mm. lato apice constricto, sepalis 4 conniventibus 1 mm. longis glabrescentibus, episepalis 4 iis paulo longioribus angustioribusque omnibus apice incrassatis. *Stamina* duo, brevia. *Styli* 10–12, stigmatibus subclavatis. *Semina* 10.

VENEZUELA: Prov. de Mérida, Sa. Nevada, circiter 3700 m. alt., *Linden* 688 (Herb. Berol. ex Herb. Trev., typus.); Paramo de Mucuchies, *Moritz* 1115 p.p.m. (Herb. Berol.).

Nomen *A. galioides* Trev. propter homonymum Benthamianum* rejiciendum est. Planta notabilis floribus magnis, numero stylorum, pilositate faciei interioris hypanthii, ab omnibus speciebus sectionis diversa.

Lachemilla Mutellina Rothm., sp. nov. (sect. *Aphanoides*, subsect. *Pachyrrhizae*); forma petiolorum stipularumque ab omnibus speciebus diversa, inter species subsectionis singularis numero stylorum et localitate boreali (except. *L. pinnata*) insignis; habitu proxima *L. frigidae*† sed diversissima characteribus notatis.

Planta habitu *Artemisiarum* alpinarum Europae, caespitosa, 5–15 cm. alta, caulibus erectis vel adscendentibus, radicibus incrassatis. *Folia* basalia 17 mm. lata, 12 mm. longa, petiolata, petiolis 6–7 mm. latis 15 mm. longis, stipulis hyalinis fere ad basin laminae usque adnatis (pars libera petioli 2–3 mm. attingens) apice liberis viridibus trifidis margine hirsuto-ciliatis, tripartita, partitionibus lateralibus ad med. incisus 3-lobis, lobis rhomboideis apice 3–7-dentatis, dentibus lanceolatis. *Lamina* utrinque glabra, subtus pallida glauca, supra viridis, margine hirsuto-ciliata. *Folia* caulina similia, minora, subsessilia, petiolis stipulisque subamplexicaulia. *Flores* in ramulis lateralibus glomerulati, 3 mm. longi, hypanthio glabro vel glabrescente, sepalis 4 triangulari-ovatis extra hirsutis, episepalis 4 lanceolatis sepalis brevioribus et dimidio angustioribus. *Stamina* duo, brevia. *Styli* 7–8, longi, stigmatibus clavatis. *Semina* parva, nigra, longe stipitata.

VENEZUELA: Mérida, Quebrada de Saisay, 3580 m. alt., fl. aprili, 1930, *Gehriger* 54 (Herb. Genev.).

Lachemilla Steinbachii Rothm., sp. nov. (sect. *Aphanoides*, subsect. *Radicanter*) ; ex affinitate *L. pseudovenustae*,‡ *L. Perryanae*,§

* **Lachemilla galioides** (Benth.) Rothm., comb. nov.—*Alchemilla galioides* Benth. Pl. Hartweg. 134 (1844).

† **Lachemilla frigida** (Wedd.) Rothm., comb. nov.—*Alchemilla frigida* Wedd. Chlor. And. 2, 245 (1857).

‡ **Lachemilla pseudovenusta** Rothm., comb. nov.—*Alchemilla pseudovenusta* Rothm. in Notizbl. Bot. Mus. Berlin-Dahlem, 12, 489 (1935).

§ **Lachemilla Perryana** Rothm., comb. nov.—*Alchemilla Perryana* Rothm. *Alchemillae* Columbianae, 35 (1935).

et *L. Hultenii*, * sed a primo foliorum lobis profunde incis, a secundo stylis globosis, foliis reniformibus subtus villosis nec subsericeis, a tertio foliis minus profunde incis, sepalis et variis notis differt.

Planta suffruticosa, habitu *L. pseudovenustae*, caulibus ad 60 cm. longis procumbentibus apice radicantibus, adultis glabris, juvenilibus dense villosis-hirsutis. *Folia* petiolata, petiolis 3–6 mm. longis, reniformia, 10–17 mm. lata, 7–10 mm. longa, fere ad basin usque tripartita, lobis lateralibus ad $\frac{2}{3}$ bifidis, lobis cuneato-obovatis apice subtruncatis, dentibus 7–9 ovato-lanceolatis longis porrectis acutissimis penicillatisve; lamina supra viridis, glabra vel glabrescens, subtus pallida, pilis longis subvillosis dense pilosa. *Stipulae* 2–3-fidae, dentibus longis anguste lanceolatis. *Folia summa* subsessilia, stipulis irregulariter partitis reflexis. *Flores* breviter pedicellati, in axillis bractearum solitarii, in inflorescentiis racemoso-cymosis apicem ramorum floriferorum versus aggregati, 2–25 mm. longi. *Hypanthium* ovatum, 1 mm. longum, dense adpresse hirsutum, sepalis 4 late ovatis acutiusculis, episepalis 4 paulo brevioribus multo angustioribus ovato-lanceolatis acutiusculis apice incrassatis omnibus extra hirsutis. *Styli* 2, breves, stigmatibus globosis. *Stamina* 2, stylis aequilonga. *Semina* 2.

BOLIVIA: Yungas de San Mateo, Comarapa, Dep. Sta. Cruz, 2600 m. alt., Oct. 1928, Steinbach 8439 (Herb. Kew. et Berol.).

***Alchemilla Trollii* Rothm.**, sp. nov. (sect. *Brevicaules*, subsect. *Heliodrosium*, ser. *Vulgares*, subser. *Hirsutae*).

Planta mediocris, caulibus 3–15 (–30) cm. altis erectis flexuosis tota longitudine pilis recte patentibus vel paulum deorsum flexis dense pilosis. *Folia radicalia* 2–3.5 (–7) cm. lata, 1.5–3 (–5.5) cm. longa, subreniformia, sinu basali subcordato $\pm$ aperto, circumcirca ad $\frac{1}{3}$ radii longitudinis usque palmatim incisa, incompl. 7- vel rarius incompl. 9-lobata, primaria supra glabra vel glabrescentia, aestivalia disperse longeque pilosa, subtus primaria nervis exceptis glabra, cetera dense longeque hirsuta, nervis pilis patentibus obsitis, petiolis 1–5 (–15) cm. longis, exterioribus raro glabrescentibus plerumque omnibus pilis paulo vel rarius conspicue deorsum flexis dense pilosis instructa; lobi foliorum primariorum cuneato-obovati vel semiorbiculares, apice subtruncati, dentibus utrinque 4–6 acutis lanceolatis vel lanceolato-ovatis longis porrectis apice incurvatis conniventibus penicillatis, dente apicali aequali digitato-dentato, basi incisura integra $\pm$ longa; lobi foliorum aestivalium parabolici, incisura integra nulla, circumcirca dentibus 6–7 latioribus ovato-lanceolatis acutis porrectis apice acutis incurvatis paulo conniventibus, dente apicali subaequali incisodentati. *Folia caulina* 3–4, mediocria, utrinque disperse pilosa vel glabrescentia. *Inflorescentia* contracta, paulo ramosa, ramis erectis

* ***Lachemilla Hultenii* Rothm.**, comb. nov.—*Alchemilla Hultenii* Rothm. in Arkiv för Botanik, 28 A, no. 3, 5 (1935).

sparse patentim pilosis, ramulis brevibus glabrescentibus instructa, e cymis glomerulatis densissimis paucifloris solitariis vel paucis saepe $\pm$ confluentibus composita, pedicellis glabris longitudine florum vel brevioribus praedita. Flores viridi-lutescentes, 2.75–3 mm. longi, 3 mm. lati, urceolis campanulato-conicis pilis patentibus sparsissime pilosis, sepalis ovatis, episepalis lineari-lanceolatis acutis, omnibus dorso et apice pilis paucis barbulatis praediti.

W. HIMALAYA : Nanga-Parbat, Guricot-Alm, 3400 m. *C. Troll* 7525 (Typus, Herb. Berol.) ; Astor, *Duthie* (Herb. Kew.) ; Kashmir, Sango Sir, *Giles* 592 (Herb. Kew.) ; Sonamarg, *Stewart* 6463 (Herb. Kew.) ; Kashmir, *Falconer* (Herb. Kew., c. *A. chthamalea*), id. *Falconer* 389 (Herb. Kew. mixt. *A. fusicalyx* Rothm. ined.).

***Alchemilla ypsilotoma* Rothm., sp. nov.** (sect. *Brevicaules*, subsect. *Heliodrosium*, series *Vulgares*, subs. *Heteropodae*).

Planta mediocris, haud debilis, caulibus arcuato-adscendentibus flexuosis 10–20 cm. altis, internodio basali glabro, internodiis 2 et 3 sparse vel sparsissime pilis patentibus vel reflexis pilosis. *Folia radicalia* mediocria, 3–5 cm. longa, 4–6.3 cm. lata, reniformia, sinu basali rectangulatim vel plerumque amplius aperto, circumcirca ad $1/3$ – $2/7$ radii longitudinis usque palmatim incisa lobis divaricatis, 7- vel incompl. 9-loba utrinque disperse vel dispersissime pilosa aut glabra nervis subtus exceptis, petiolis 5–9 cm. longis flexuosis pilis patentibus vel reflexis haud dense pilosis aut glabrescentibus vel glabris instructa ; lobi parabolici, basi incisura Y-formi integra brevi, versus apicem circumcirca dentibus utrinque 5–6 rarius ad 7 late ovatis mammilliformibus obtusis mucronulatis breviter penicillatis paulo inaequilateralibus porrectis inaequalibus medianis maximis dente apicali minore sed elongato et longiore dentati. *Folia caulina* 4–5 haud parva. *Inflorescentia* sat expansa, ramosa ramis flexuosis ramulis subpatentibus pedicellis longitudine florum glabris instructa, e cymis corymbosis sat densis composita. Flores 2–2.5 mm. longi, 3 mm. lati, urceolis conico-campanulatis glabris, sepalis ovato-oblongis, episepalis lanceolatis glabris vel raro apice pilis solitariis obsitis praediti.

W. HIMALAYA : Kashmir, Sonamarg, *Rich* 1176 (Typus, Herb. Kew.) ; Sonamarg, Sind Valley, *Duthie* 11 519 (Herb. Berol.) ; Baltistan, Satpur nullah, *Duthie* (Herb. Univ. Vindob. f. *aprica*).

***Alchemilla cashmeriana* Rothm., sp. nov.** (sect. *Brevicaules*, subsect. *Heliodrosium*, ser *Vulgares*, subser. *Subglabrae*).

Planta mediocris, sat robusta, caulibus nonnullis adscendenti-erectis, sat rigidis, 10–12 cm. altis, tota longitudine pilis subadpressis dense pilosis. *Folia radicalia* undulata mediocria 3 cm. longa, 3.5–4 cm. lata reniformia, sinu basali $\pm$ aperto plerumque rectangulato, circumcirca ad $1/4$ radii longit. usque palmatim incisa, 7- vel incompl. 9-loba, utrinque pilosa, supra disperse,

subtus sat dense adpresse pilosa, petiolis 2–3 cm. longis dense subadpresse pilosis instructa; lobi basi sese obtegentes semi-elliptici vel triangulatim parabolici circumcirca dentibus utrinque 5–7 longis lanceolato-ovatis acutis porrectis apicem versus incrementibus digitato-dentatis, dente apicali multo angustiore lanceolato, rarius brevior. *Folia caulina* multa, sat magna, 1–2 cm. lata, 0·8–1·3 cm. longa, reniformia, basi subtruncata vel cuneato-truncata, ad $1/4$ longit. 5-lobata, lobis truncatis vel leviter arcuatis dentibus magnis acutis subconniventibus dentata, indumento foliorum radicalium. *Stipulae* ad $1/2$ longitud. irregulariter incisae, lobis late ovato-lanceolatis incisae, sat parvae. *Inflorescentia* densa, ramis paucis brevibus paulo divaricatis pilis erectis vel subadpressis dense pilosis, ramulis pedunculisque glabris, pedicellis glabris quam floribus brevioribus, e cymis dense glomerulatis composita. *Flores* virides, glabri vel saepius pilis solitariis obsiti, 3 mm. longi, 3–3·5 mm. lati, urceolo pyriformi, sepalis late ovato-triangularibus, episepalis ovatis $3/4$ longitud. sepalorum attingentibus, omnibus obtusis praediti.

W. HIMALAYA: Mali Khagan Valley, 3120 m., 19.vii.1896, *Duthie* (Typus, Herb. Vindob.); Nila Kagan, Hazara, *Duthie* (Herb. Kew., f. fol. glabrescentibus).

Alchemilla chthamalea Rothm., sp. nov. (sect. *Brevicaules*, subsect. *Heliodrosium*, ser. *Vulgares*, subser. *Glabrae*).

Planta parva, caulibus decumbentibus vel flexuoso-adscentibus 3–7 cm. longis glaberrimis vel internodio primo (infimo) pilis adpressis sparse pilosis. *Folia radicalia* parva, 1–1·5 cm. longa, 1·5–2 cm. lata, reniformia sinu basali late aperto subcordato-truncato, circumcirca ad $1/4$ radii longit. usque palmatim incisa incompl. 7-loba, utrinque glaberrima, nervis subtus prominulis apice sparse adpresse pilosis, petiolis 1–2 cm. longis glaberrimis; lobi cuneato-quadrati e basi brevi integra subcuneata, apice leviter arcuato-truncato, dentibus utrinque 3–6 brevibus acutis subporrectis apice paulo incurvato-subconniventibus breviter penicillatis crenato-dentati, dente apicali paulo minore nec brevior. *Folia caulina* 3–4, sat magna, circiter 1 cm. lata, 0·8 cm. longa, basi subtruncata semiorbicularia, vix incisa, circumcirca crenato-dentata, indumento foliorum radicalium, sed summa ut stipulae supra sparse et disperse pilosa; stipulae sat magnae, summae vix incisae, breviter dentatae. *Inflorescentiae* ad apices caulium glomeratim congestae, ramis nullis vel brevibus. *Flores* breviter pedicellati, pedicellis glabris, 2·5 mm. lati, glabri, sepalis late ovatis obtusis, episepalis brevibus, $1/2$ sep. longit. vix attingentibus obtusis ovatis praediti. Flores maturi deficiunt, urceolus globoso-ovatus glaberrimus esse videtur.

W. HIMALAYA: Kashmir, Sumbliali, 3000–3300 m., *Duthie* 11147 (Typus, Herb. Kew.); sine loco et numero, *Falconer* (Herb. Kew.); Kashmir, *Falconer* 389, p.p. (Herb. Monach).

**XLIV—ADDITIONS TO THE FLORA OF BORNEO AND
OTHER MALAY ISLANDS: X.*** H. N. RIDLEY.

CONNARACEAE.

The following are not recorded by Merrill in his list of Bornean plants.

Santaloides Havilandii Schellenb.

SARAWAK. Rejang Sibü, *Haviland* 2880.

Santaloides floridum (Jack) Kuntze.

DUTCH BORNEO. *Korthals*.

Santaloides ovale Schellenb.

SARAWAK. *Beccari* 2731, 2831, 2899.

Santaloides cordatum Schellenb.

SARAWAK. *Beccari* 2685 ; Rejang Sibü, *Haviland* 2882.

Santaloides simplicifolium (Bl.) Kuntze.

SARAWAK. *Beccari* 3043.

Roureopsis javanica Planch.

SARAWAK. Kuching, *Haviland* 2881.

Cnestis palala (Lour.) Merrill.

SARAWAK. *Beccari* 1117 ; Saribas, *Haviland* 1604.

BRIT. N. BORNEO. Tawao, Elphinstone Province, *Elmer* 20995, 21482.

Castanola insignis Schellenb.

SARAWAK. Near Kuching, *Haviland* 867 ; Sarawak river, *Haviland* c.d.c.c.

Ellipanthus Kingii Boerl. et Koord.

SARAWAK. *Beccari* 2627.

Ellipanthus sarawakensis Schellenb.

SARAWAK. Kuching, *Haviland* 496, 1815.

Connarus euphlebius Merrill.

DUTCH BORNEO. Sungei Mandai, *Hallier*.

SARAWAK. *Beccari* 3806 ; Rejang Kapit, *Haviland* 2884.

BRIT. N. BORNEO. Tawao, Elphinstone Province, *Elmer* 20438, 21270 ; Sandakan, *Ramos* 1181.

Connarus falcatus Bl.

DUTCH BORNEO. *Korthals*.

SARAWAK. *Beccari* 1244, 3579, 4058 ; *Native Collector* 2550.

Connarus grandis Jack.

SARAWAK. *Beccari* 833, 1129, 3973, 3339 ; Kuching, *Haviland* 2285, 2883.

* Continued from K.B. 1938, 242.

BRIT. N. BORNEO. *Creagh*; Tawao, Elphinstone Province, *Elmer* 21039, 21347.

Connarus Jackianus Schellenb.

BRIT. N. BORNEO. *Creagh*.

Connarus mutabilis Bl.

DUTCH BORNEO. *Korthals*; Banjarmasin, *Motley* 47: "Scrambling shrub, not uncommon, flowers pearly white with scent of violets, very little used as a febrifuge. *Penawar hauta*."

SARAWAK. Lundu, *Ridley* 12460; Santubong, *Bartlett* in *Haviland* 1534K.

Connarus villosus Jack. *C. odoratus* Hook. fil.

SARAWAK. Brooketon, *Haviland* 1453; Mt. Singhi, large climber, petals white, *Haviland* 1998.

BRIT. N. BORNEO. *Fraser*; Labuan, *Motley*; Tawao, *Elmer* 21058, 21617.

Connarus Winkleri Schellenb.

DUTCH BORNEO. Hayup, *Winkler* 2567.

SARAWAK. Saribas, *Haviland* 1597.

BRIT. N. BORNEO. Tawao, *Elmer* 20770.

LEGUMINOSAE.

Crotalaria chinensis L.

SARAWAK. *Beccari* 3717; Miri, *Haviland & Hose* s.n. (single spec.).

BRIT. N. BORNEO. Kalumbini, sandy plains, *Burbidge*.

Crotalaria retusa L.

DUTCH BORNEO. Banjarmasin, *Motley* 394: "Cultivated, seeds eaten."

Indigofera tinctoria L.

SARAWAK. Saribas, *Haviland* 1566; near Kuching, escape from cultivation, *Haviland* 2887.

Tephrosia candida DC.

SARAWAK. *Beccari* 2180.

Abrus mollis Hance.

DUTCH BORNEO. Banjarmasin, *Motley* 1188.

SARAWAK. Bongsit, young jungle, slender climber, *Haviland* 57 (b.s.n.e.).

This is otherwise only known from China.

Canavalia rosea DC.

SARAWAK. Lundu, *Haviland* 1016; Miri, *Hose* 605.

BRIT. N. BORNEO. Mouth of Lahat River, *Burbidge*; Banguay Island, *Castro* 1498.

Canavalia turgida *Grah.*

BRIT. N. BORNEO. Kudat, *Fraser* 210.

Pueraria phaseoloides *Benth.*

SARAWAK. *Beccari* 2848.

Vigna lutea *A. Gray.*

SARAWAK. *Beccari* 1259, 1742.

BRIT. N. BORNEO. *Creagh.*

Mucuna monosperma *Roxb.*

SARAWAK. *Beccari* 2748.

Mucuna acuminata *Grah.*

SARAWAK. Kuching, *Haviland* 967.

Phaseolus luteus *Bl.*

DUTCH BORNEO. Banjarmasin, *Motley* 404.

Aeschynomene indica *L.*

DUTCH BORNEO. Banjarmasin, *Motley* 700.

Cyclocarpa stellaris *Afzel.*

DUTCH BORNEO. Banjarmasin, *Motley.*

This plant seems to be fairly abundant in West Tropical Africa, and has been met with in Queensland, Australia, but apparently nowhere else. Its occurrence in Borneo is most remarkable.

Desmodium cephalotes *Wall.*

DUTCH BORNEO. Banjarmasin, *Motley* 51.

Desmodium gangeticum *DC.*

DUTCH BORNEO. Banjarmasin, *Motley* 146.

Desmodium laxiflorum *DC.*

DUTCH BORNEO. Banjarmasin, *Motley* 426.

Desmodium ovalifolium *Wall.*

SARAWAK. *Beccari* 1017 ; *Miri, Hose* 515.

BRIT. N. BORNEO. Dent Province, *Gibbs* 2923.

Desmodium pulchellum *Desr.*

DUTCH BORNEO. Banjarmasin, *Motley* 144.

Desmodium reticulatum *Champ.*

SARAWAK. *Beccari* 1018.

Uraria lagopodoides *DC.*

DUTCH BORNEO. Banjarmasin, *Motley* 424.

Spatholobus littoralis *Hassk.*

DUTCH BORNEO. Banjarmasin, flowers white, *Motley* 749.

A native also of Java. New to Borneo.

Spatholobus persicinus Ridley, sp. nov., a *S. crassifolia* Benth., cui affinis, paniculis longioribus multifloris, calycis dentibus brevioribus, corolla rosea, vexillo integro differt.

Frutex scandens, ferrugineo-hirtus. *Folia* trifoliolata, petioli 2–2.5 cm. longis, ferrugineo-hirtis; foliola coriacea, supra glabra, subtus nervis et costa hirtis, elliptica, acuminata, obtuse mucronulata, 7–8 cm. longa, 3.5–4 cm. lata, nervis 8-paribus inter se arcuato-anastomosantibus; petiolulis 4 mm. longis. *Stipulae* falcatae, acuminatae, pubescentes, 1 cm. longae, 4 mm. latae. *Paniculae* terminales et axillares, dense ferrugineo-hirtae, 15–29 cm. longae, ramis 3–8 cm. longis densifloris. *Bractee* lanceolatae, acuminatae, hirtae. *Bracteolae* lineari-lanceolatae, acuminatae, 2 mm. longae. *Flores* copiosi, fasciculati, pedicellis hirtis 1–2 mm. longis. *Calyx* cylindrico-urceolatus, intus et extra hirtus, 4 mm. longus, dentibus brevibus obtusis 2 supremis connatis. *Corolla* pallide rosea, glabra, 5 mm. longa, vexillo rotundato integro lato brevissime unguiculato, petalis carinae spathulatis obtusis unguiculatis. *Stamina* 10, glabra, alterna, breviora, filamentis linearibus basibus dilatatis, antheris oblongis. *Ovarium* cylindricum, hirtum. *Stylus* glaber, curvus, stigmatibus minuto.

DUTCH BORNEO. Banjermasin, flowers light rose, Motley 734.

Saraca elegans Ridley, sp. nov., a *S. triandra* Bak., cui affinis, floribus multo minoribus flavis glabris, corymbis glabris laxioribus, foliolis longe acuminatis, nervis paucioribus differt.

Arbor. *Folia* bijuga; foliola tenuiter coriacea, elliptica vel lanceolata, longe acuminata, basi breviter attenuata, 13–16 cm. longa, 3–8.2 cm. lata, nervis 8-paribus, secundariis et reticulationibus laxis utraque pagina elevatis; petioluli crassi, transversim rugosi, 1 cm. longi. *Corymba* axillaris, laxa, patens, glabra, ramis gracilibus, 6 cm. longa, 10 cm. lata. *Bractee* lanceolatae, marginibus ciliatis, 1 mm. longae, ad bases ramorum latiores 3 mm. longae. *Bracteolae* ovato-rotundatae, 5 mm. longae, 3 mm. latae. *Calycis* tubus gracilis, superne sensim dilatatus, 1.5 cm. longus, lobis ovato-ellipticis rotundatis 5 mm. longis. *Stamina* 3, filamentis filiformibus 1 cm. longis. *Ovarium* glabrum.

SARAWAK. Rejang, Belaga, Haviland 2905 (type); Baram, Lio-Matu, flower yellow, Moulton 39.

This appears to take the place of *S. triandra* Baker, common in the Malay Peninsula and found also in Sumatra and the Anambas islands (Henderson 20125).

Saraca Hullettii Prain in Journ. As. Soc. Beng. 66, 492 (1897). Dr. Prain gives only a short incomplete diagnosis of this species, which is the commonest one in Borneo, and as the genus is a very critical one I supply herewith a more complete description.

Arbor parva, ramis albescentibus. *Folia* bijuga, raro trijuga; foliola glabra, coriaceo-chartacea, lanceolata vel ovato-lanceolata, acuminata, basibus angustatis, 15–18 cm. longa, 4–8 cm. lata,

nervis 7-paribus utraque pagina elevatis ; petioluli crassi, rugosi, 8 mm. longi. *Corymbi* axillares, breviter pedunculati, laxi, multiflori, pubescentes, 9–10 cm. longi, 15 cm. lati. *Pedicelli* 1–2 cm. longi. *Bractea* basalis, oblonga, 7 mm. longa, 8 mm. lata. *Bracteolae* binae, ovato-rotundatae, 7 mm. longae, 4 mm. latae. *Calyx* kermesinus, tubo elongato-urniformi 6 mm. longo, lobis oblongis obtusis 5 mm. longis. *Stamina* 3 vel 4, glabra, 1.5 cm. longa, antheris oblongis. *Ovarium* hirtum, gynophoro gracili hirtum. *Legumen* (inimaturum) oblongum, apiculatum, 6 cm. longum, 3 cm. latum.

SARAWAK. *Beccari* 759, 916, 2289, 7597. Kuching, *Saheb* 16318, *Ridley* 12384 ; 3 miles from Kuching, *Haviland* 829. Baram, *Hose* 23, 224.

BRIT. N. BORNEO. Sine loc. exact., *Lowe*.

It is allied to *S. macroptera* Miq., of Sumatra, but the leaflets are smaller and thinner and flowers half the size.

Saraca longistyla *Ridley*, sp. nov., a *S. Hullettii* Prain, cui affinis, foliis 4-jugatis, foliolis lanceolatis, floribus majoribus, staminibus 6, bracteis caducis lanceolatis denticulatis differt.

Arbor magna. *Folia* 4-jugata ; foliola coriacea, oblongo-lanceolata, acuta vel acuminata, basibus angustatis, obtusa, 18 cm. longa, 5–8 cm. lata, nervis tenuibus 8-paribus, secundariis conspicuis pluribus ; petioluli crassi, superne canaliculati, 1 cm. longi. *Corymbi* subsessiles, glabri, multiramosi, 14 cm. longi, 16 cm. lati. *Bracteae* caducae, coriaceae, lanceolatae, marginibus denticulatis, 5 mm. longae. *Bracteolae* ovatae, obtusae, tenues, rubrae, 1 cm. longae, 5 mm. latae. *Calycis* tubus angustus, cylindricus, 1.5 cm. longus, lobis oblongo-obovatis 1 cm. longis 4 mm. latis rubris. *Stamina* 6, filamentis capillaribus 1 cm. longis, antheris oblongis minutis. *Ovarii stipes* pubescens, 2 mm. longus. *Stylus* tenuis, 1.5 cm. longus. *Legumen* oblongo-lineare, obtusum, lignosum, marginibus incrassatis, 34 cm. longum, 7 cm. latum.

SARAWAK. *Lundu*, *Haviland* 879, *Anderson* 130 (type) ; near *Quop*, *Haviland* 620.

A specimen collected by *Motley* (no. 1217) at Banjarmasin, DUTCH BORNEO, appears to be the same species, but the leaflets are rather more long pointed. He describes it as “a large shrubby tree ; flowers scarlet, handsome,” and indeed it is clearly a magnificent species.

Cynometra inaequalifolia *A. Gray*. *C. Elmeri* Merrill.

BRIT. N. BORNEO. Tawao, Elphinstone Province, *Elmer* 21386.

Albizzia stipulata *Benth.*

SARAWAK. Near Pengkulu Ampat, young jungle tree, *Haviland* 52, 295.

Acacia Farnesiana *Willd.*

DUTCH BORNEO. Banjarmasin, *Motley* 670.

BRIT. N. BORNEO. Kudat, *Balajadia* in *For. Dept.* 4047.

Mimosa sepiaria Benth.

SARAWAK. Kuching, *Haviland* 525 : "probably introduced."

This small tree was introduced into Singapore many years ago from Kew, as a hedge and firewood plant, and I believe sent thence to Sarawak. It was used in Singapore as a hedge plant, and when fresh the wood was easy to cut, but when dry the natives affirmed it became too hard for most axes to cut. Hence it was not popular, and has hardly spread in the Malay region at all.

Parkia speciosa Hassk.

SARAWAK. Saribas, *Hewitt* : "*Buah Putai* ; fruits eaten."

BRIT. N. BORNEO. Bundu, K. Penyu, *Goklin* in *For. Dept.* 2806 : "Tree 40 ft. high, 36 in. girth. Flower white. Edible fruit."

Baphia micrantha Ridley, sp. nov., a *B. borneënsi* Oliv., cui affinis, racemis accrescentibus parce hirtis, floribus minoribus, calyce bilobo lobis rotundato-oblongis, staminibus glabris differt.

Arbor vel frutex. Folia oblongo-elliptica, acuminata, basibus rotundatis, coriacea, glabra, 10–15 cm. longa, 4–8 cm. lata, nervis 7-paribus tenuibus anastomosantibus, cum nervulis et reticulationibus in utraque pagina elevatis ; petioli graciles, apice incrassati, rugosi, 2 cm. longi. *Racemi* 1–3, graciles, accrescentes, superne sparse hirti, 12.5 cm. longi. *Bractee* breves, ovatae, 1 mm. longae. *Pedicelli* 5 mm. longi, graciles, parce hirti. *Calyx* bilobus, lobis rotundato-oblongis sparse hirtis, dentibus quinque 5 mm. longis 3 mm. latis. *Corolla* : vexillum rotundato-ovatum, glabrum, unguiculatum, 1 cm. longum, 5 mm. latum ; alae oblongae, apicibus rotundatis, subaequilongae, unguiculatae ; carina oblanceolata. *Stamina* 5 mm. longa, glabra, antheris oblongis apiculatis multo brevioribus. *Ovarium* 5 mm. longum, basi attenuatum, quasi stipitatum, parce hirtum. *Stylus* glaber, 5 mm. longus.

SARAWAK. Baram, *Hose* 337 (type), 257.

A second species of the genus *Baphia* from Borneo, otherwise confined to Africa. From *B. borneënsis* Oliv. it is distinguished by the long slender elongating racemes, and the calyx dividing into two nearly equal lobes. The corolla is glabrous and the whole inflorescence is sparsely hairy, not velvety.

ROSACEAE.

Rubus alceifolius Poir.

BRIT. N. BORNEO. Labuan, hedges and thickets, *Burbidge* : "Fruits small, red."

Rubus angulosus Focke.

BRIT. N. BORNEO. Jesselton, *Mrs. Clemens* 9643 ; Tawao, Elphinstone Province, *Elmer* 21189.

The first specimen exactly resembles the Singapore plant on which Focke based his species. In Elmer's plant the bracts are more deeply lacinate than usual.

Rubus elongatus Sm.

SARAWAK. Bau, Ridley 11766.

Rubus Gardnerianus O. Kze.

BRIT. N. BORNEO. Tenom, bridle-path to Melalap, Gibbs 2856.

Rubus glomeratus Bl.

SARAWAK. Beccari 970 ; Bau, Ridley 11764 ; Kuching, Ridley ; Matang, Haviland 58/36.

Pygeum Hookerianum King var. **borneense** Ridley, var. nov., differt a planta peninsulari typica floribus minus hirtis, calyce scabrido-hirto, lobis ferrugineo-villosis.

SARAWAK. Long Lama, Hose 186.

This closely resembles *P. Hookerianum* King, of the Malay Peninsula, but the flowers are not all red-woolly as in the type, the calyx is only covered with appressed scabrid hairs, and only the lobes are red-woolly.

Pygeum Havilandii Ridley, sp. nov., a *P. lanceolato* Hook. fil., cui affine, floribus minoribus parce pubescentibus, lobis calycis intus lanuginosis differt.

Arbor glabra. *Folia* tenuiter coriacea, laevia, lanceolata, obtuse cuspidata, basibus obtusis, 6 cm. longa, 2.5 cm. lata, nervis 5-paribus inconspicuis haud elevatis, costa subtus elevata ; petioli 8 mm. longi. *Racemi* axillares, pauciflori, hirti, 1 cm. longi. *Bractee* ovatae, acutae, vix 1 mm. longae. *Pedicelli* 2 mm. longi. *Calyx* campanulatus, sparse hirtus, lobis 8 lanceolatis intus lanuginosis. *Stamina* circiter 16, glabra, 2 mm. longa. *Ovarium* parvum, conicum, glabrum. *Stylus* glaber, stigmatibus capitato bilobo.

SARAWAK. Near Kuching, flowers slightly scented, Haviland 2063.

This is undoubtedly closely allied to *P. lanceolatum* Hook. fil., of Penang Hill, but the flowers are smaller and the calyx except for the woolly sepals has but few hairs.

Pygeum Beccarii Ridley, sp. nov., a *P. parvifloro* Miq., cui affine, foliis rotundatis obtusis glabris, nervis paucioribus, stylo longiore differt.

Frutex altus, ramis junioribus pubescentibus. *Folia* coriacea, glabra, obovata, apicibus rotundatis, basibus acuminatis, 11 cm. longa, 7.5–9 cm. lata, nervis supra depressis subtus elevatis 5-paribus ; petioli 1–2 cm. longi. *Stipulae* ovato-oblongae, subrotundatae, coriaceae, glabrae, marginibus dense velutinis. *Racemi* axillares, infra folia orti, hirti, 3–4 cm. longi, densiflori. *Bractee* oblongae, obtusae, hirtae, 1 mm. longae. *Pedicelli* 1 mm. longi. *Calyx* obconicus, 3 mm. longus, dense hirtus, lobis 8 ovatis extra dense hirtis. *Stamina* numerosa, gracilia, 3 mm. longa, glabra. *Ovarium* ovoideum, glabrum, serie pilorum circa basin instructum. *Stylus* validus, 4 mm. longus, stigmatibus orbiculari.

SARAWAK. *Beccari* 3516; Penkulu Ampat, Sarawak River, *Haviland* "b.r.o.b." (type), 755.

The flowers of this plant resemble those of *P. parviflorum* Miq. but the style is distinctly longer. The foliage is much more like that of *P. polystachyum* Hook. fil. but without the basal glands on the leaf.

***Pygeum parviflorum* Miq.**

SARAWAK. *Beccari* 3895.

Exactly like Miquel's plant from Java.

***Pygeum lampongum* Miq.**

SARAWAK. Kuching, *Haviland* 2011, 2144; *Haviland & Hose* 104.

A native also of Sumatra.

***Pygeum stipulaceum* King.**

SARAWAK. Near Kuching, a small tree, *Haviland & Hose* 3378.

Also known from Bangka, Sungei Liat, M. Boei, *Teysmann*, and the Malay Peninsula. The fruits in *Teysmann*'s specimen are pisiform, about 4 mm. through and sparsely hairy.

RHIZOPHORACEAE.

***Pellacalyx cristatus* Hemsl.**

SARAWAK. *Beccari* 1258.

***Pellacalyx Lobbii* Schimp.**

BRUNEI. Hills, *Lobb*.

***Carallia cuprea* Ridley**, sp. nov., a *C. eugenioidea* King, cui affinis, floribus brevissime racemosis, foliis ellipticis cuspidatis differt.

Arbor parva. *Folia* coriacea, supra laevia, subtus cuprea, elliptica, breviter obtuse cuspidata, basibus attenuatis, 5–6 cm. longa, 2.5–3 cm. lata, nervis tenuibus inconspicuis parallelis 10-paribus, secundariis parallelis anastomosantibus; petioli crassiusculi, rugosi, 5–6 mm. longi. *Flores* sessiles, pauci, in racemis axillaribus 5 mm. longis. *Bractee* minutae, orbiculares. *Calyx* globoso-campanulatus, lobis 5-brevibus obtusis, ovalis, 3 mm. longus. *Petala* 5, alba, paullo longiora, spathulata, apicibus dilatatis ovatis laciniatis stamina involventibus. *Stamina* 10, 5 petalis subaequilonga, 5 longiora. *Stylus* crassiusculus, vix longior.

SARAWAK. Kuching, *Haviland* 2915: "Small tree, petals white hooding larger stamens."

***Carallia confinis* Bl. var. *pauciflora* Bl.**

SARAWAK. *Beccari* 2780.

***Carallia viridiflora* Ridley**, sp. nov., a *C. integerrima* DC., cui affinis, foliis ellipticis vel ovatis, floribus minoribus in umbellis longipedunculatis differt.

Arbor. *Folia* coriacea, integra, supra nitida, elliptica vel ovata, breviter obtuse cuspidata, basibus cuneatis, 5–8 cm. longa,

2-4 cm. lata, nervis plurimis parallelis intra margines arcuantibus ; petioli 5 mm. longi. *Cymae* axillares, pedunculis 2.5 cm. longis, ramis 3 patentibus 1 cm. longis. *Flores* virescentes, sessiles vel brevissime pedicellati, 3-4 in apice rami. *Bracteae* binae, ovatae, rotundatae. *Bracteolae* rotundatae. *Calyx* campanulatus, 2 mm. longus, lobis 5 ovatis 1 mm. longis. *Petala* 5, vix longiora, unguiculata, lamina rotundata denticulata. *Stamina* 10, filamentis teretibus 2 mm. longis. *Ovarium* uniloculare, ovulis 10 ab apice pendulis. *Stylus* validulus, stigmatе capitato quinquelobo.

SARAWAK. *Beccari* 3367 ; near Kuching, flower greenish, *Haviland* 2085 (type).

This is allied to *C. integerrima* DC., but the flowers are in long-pedunculate cymes and much smaller and the leaves more elliptic.

***Carallia coriifolia* Ridley**, sp. nov., a *C. suffruticosa* Ridley, cui affinis, foliis crasse coriaceis subintegris, floribus majoribus differt.

Arbor parva. *Folia* rigide coriacea, elliptica, abrupte acuminata, cuspidata, basibus cuneatis, marginibus obscure serratis, 12 cm. longa, 5 cm. lata, nervis subtus elevatis 10-paribus intra margines inarcuatis, nervis secundariis anastomosantibus ; petioli crassi, 5 mm. longi. *Flores* 1 usque complures, in axillis sessiles. *Bracteae* ovatae, coriaceae, persistentes, 2 mm. longae. *Calyx* subcylindricus, 2 mm. longus, lobis 5 lanceolatis acuminatis coriaceis 2 mm. longis. *Petala* 5, unguiculata, panduriformi-oblonga, basi limbi dilatata laciniata, medio angustato integro, apice oblongo dilatato laciniato, stamina involventia. *Stamina* 10, longiora, antheris dorsifixis ovatis subacutis. *Discus* lobatus, margine elevato. *Ovarium* triloculare, ovulis 4 pendulis, uno fertili. *Stylus* staminibus longior, stigmatе capitato.

SARAWAK. *Beccari* 1174, 1613 ; near Kuching, small tree, *Haviland* 1797 (type), 2310.

This is allied to *C. suffruticosa* Ridley, having the same type of inflorescence, a sessile cone-like cluster of flowers in the axil, but the leaves are rigidly coriaceous, very like those of *Gynotroches*.

COMBRETACEAE.

***Combretum sundaicum* Miq.**

SARAWAK. *Beccari* 2187 ; Rejang, Sibuan, *Haviland* 2918.

BRIT. N. BORNEO. Labuan, *Motley* 227.

***Combretum chinense* Roxb. var. *pubescens* King.**

SARAWAK. Rejang, Sibuan, shrub, *Haviland* 802.

This closely resembles the Malay peninsula plant, but the petioles are rather longer.

***Terminalia borneensis* Ridley**, sp. nov., a *T. pyrifolia* Kurz, cui affinis, foliis majoribus, petiolis brevibus, calyce vix lobato differt.

Arbor parva. *Folia* chartacea, elliptica, cuspidata, obtusa, basibus attenuatis obtusis, opposita, 16 cm. longa, 6.5 cm. lata,

nervis 10-paribus tenuibus, nervulis transversis remotis undulatis, costa subtus elevata pubescente ; petioli pubescentes, 5 mm. longi. *Racemi* axillares, hirsuti, 6 cm. longi, pedunculis nudis 2 cm. longis, parte florifera densa 4 cm. longa. *Flores* albi, plurimi, pedicellis 1 mm. longis hirsutis. *Calyx* campanulatus, intus et extra pubescens, obscure 5-dentatus, 2 mm. longus. *Stamina* 10, glabra, filamentis filiformibus 3 mm. longis, antheris subglobosis. *Stylus* subaequilongus.

DUTCH BORNEO. Banjarmasin, *Motley* 380: "Small tree, flowers white."

This species is perhaps nearest *T. pyrifolia* Kurz, but the leaves are larger, elliptic, with very short petioles, the calyx also is not distinctly lobed but has five obscure short teeth and is much less hairy.

LECYTHIDACEAE.

Barringtonia anacardiifolia Ridley, sp. nov., a *B. macrostachya* Kurz, cui affinis, foliis rigide coriaceis oblanceolatis, nervis paucis, rhachide spicae crasso, floribus majoribus differt.

Arbor magna. *Folia* rigide coriacea, integra, oblanceolata, obtusa, basibus sensim attenuatis, 28 cm. longa, 10.5 cm. lata, nervis ad 15-paribus subtus elevatis supra subdepressis ; petioli 10 cm. longi, costulati et superne canaliculati, basi incrassati. *Spica* ultra 15 cm. longa, rhachide 5 mm. crassa pallida angulata. *Flores* sessiles. *Calyx* latus, campanulatus, 1.2 cm. longus, lobis 4 rotundatis coriaceis 1.2 cm. longis. *Petala* alba, coriacea, obovato-oblonga, 2 cm. longa, 1.5 cm. lata. *Stamina* copiosa, alba, filamentis linearibus 3.5 cm. longis, antheris flavis oblongis. *Ovarium* 4-loculare, ovulis pro loculo 6-7. *Stylus* roseus, 3 cm. longus.

SARAWAK. Near Kuching, *Haviland* 2934: "Large tree ; petals and filaments white, anthers yellow, style pink, ovary 4-celled with 6 or 7 ovules in each cell."

Allied to *B. macrostachya* Kurz, but the stiffer leaves with more nerves, stouter spike-rhachis and larger flowers easily distinguish it.

Barringtonia Havilandii Ridley, sp. nov., a *B. fusiformi* King, cui affinis, foliis elongatis multinerviis oblanceolatis, pedicellis brevioribus differt.

Frutex vel *arbor*. *Folia* oblanceolata, longe acuminata, basin versus sensim attenuata, decurrentia, marginibus in junioribus minute serratis, 30-31 cm. longa, 6-9 cm. lata, chartacea, nervis ad 30-paribus supra et subtus elevatis, secundariis pluribus gracilibus, nervulis transversis undulatis ; petioli crassi, 1 cm. longi. *Racemus* gracilis, 35 cm. longus, rhachide 3 mm. crassa. *Flores* remoti, pedicellis 5 mm. longis. *Calyx* urceolatus, 5 mm. longus, lobis ovatis rotundatis 4 mm. longis. *Petala* alba, oblongo-ovata, 1 cm. longa. *Stamina* 2.5 cm. longa, filamentis capillaribus roseis basi per 4 mm. connatis, antheris ellipticis, connectivis latis. *Ovarium* triloculare, ovulis pro loculo 3 vel 4. *Stylus* capillaris, 3 cm. longus.

SARAWAK. Near Kuching, *Haviland* 2935: "Petals white, filaments pink, ovary three-celled with 3 or 4 ovules in a cell."

Careya lanceolata Ridley, sp. nov., a *C. jambosoides* Lauterbach, cui affinis, foliis lanceolatis integris tenuioribus differt.

Arbor vel frutex. *Folia* coriacea, lanceolata, acuminata, acuta, basibus angustatis, margine integro, 16–18 cm. longa, 5.5–6 cm. lata, nervis 12-paribus gracilibus inarcuantibus subtus elevatis, nervulis transversis undulatis; petioli 2.5–3.5 cm. longi, basi incrassati. *Racemi* infra folia axillares, rhachidibus crassis, 1.5 cm. longi, 5 mm. crassi. *Flores* circiter 12, sessiles, congesti. *Calyx* urniformis, 1 cm. longus, lobis 4 ovato-rotundatis 5 mm. longis. *Petala* 4, oblongo-ovata, obtusa, 2 cm. longa, 1 cm. lata, rosea. *Stamina* plurima, exteriora ananthera, filamentis linearibus 3.5 mm. longis basibus per 5 mm. connatis, interiora antheris praedita, thecis reniformibus. *Ovarium* 4-loculare. *Stylus* gracilis, 3 cm. longus.

SARAWAK. *Beccari* 1515; Kuching, *Haviland* 537, 2933 (type): "Flowers crowded in heads of about 12 flowers sessile on a short thick common receptacle, bracteate. Corolla and calyx partly pink. Petals caducous, 4, pink. Ovary 4-celled, placentas small, ovules large, few."

This is a very distinct species only resembling *C. jambosoides* Lauterb., of New Guinea, in the entire leaves. In Beccari's specimen the leaves are smaller and more ovate, 6 cm. long and 4 cm. wide, but it appears to be from a young branch.

XLV—THREE NEW SPECIES FROM TIBET.

C. E. C. FISCHER.

Vicia tibetica C. E. C. Fischer, sp. nov. [Papilionaceae]; *V. chinensis* Franch. peraffinis, sed stipulis flabellatis valde dentatis, vexillo haud unguiculato differt.

A rambling woody *undershrub*, 25–50 cm. long; stems quadrangular and often twisted above, glabrous or more or less pubescent. *Leaves* alternate, pari-pinnate; rhachis (excluding the terminal tendril) 1.5–8 cm. long, channelled above, glabrous or puberulous; leaflets from near the base, 6–16, elliptic to elliptic-oblong, 5–21 mm. long, 2–7 mm. wide, apex acute, truncate or shallowly emarginate, apiculate, glabrous or puberulous on the nerves beneath, lateral nerves 8–12 pairs, elevated on both surfaces, forked near the margins and joining the next above and below; petioles minute, pubescent; tendrils 2–3 cm. long, simple, forked, tripartite or twice forked. *Stipules* usually flabellate with 5–6 large, acuminate or caudate-acuminate teeth, up to 5 mm. long and 12 mm. wide, the upper side often much the longer, sometimes obliquely lanceolate with a single tooth. *Racemes* axillary; peduncles 3–6 cm. long, angular, glabrous; rhachis pubescent, 10–20-flowered; bracteoles minute, pubescent, deciduous; pedicels 1–2 mm. long, pubescent. *Calyx* obliquely cupular, mouth oblique, sparsely hairy; tube 3 mm.

long ; teeth 5, lanceolate to ovate, acuminate or caudate-acuminate, upper 1 mm. long, lowest 2.8 mm. long. *Corolla* blue to mauve ; *standard* oblong, 1-1.25 cm. long, 3.5-5 mm. wide, widest just below the rounded 2-lobed apex, not clawed ; *wings* as long, narrowly oblong, rounded, claw 5.5 mm. long, with a falcate, acute spur 2.6-3 mm. long above the claw ; *keel* boat-shaped, 0.8-1 cm. long, anterior end rounded, apex subacute, the petals cohering in the upper half, claw 5 mm. long, lateral lobe small, rounded, disk with a semicircular fold embracing the edge of the wing. *Vexillary stamen* with a broad filament. *Anthers* very small, oblong. *Ovary* elliptic-oblong, compressed, 5-6 mm. long on a carpophore 2 mm. long, glabrous ; ovules 6-7 ; style 2.6 mm. long, curved upwards, glabrous below, hairy about the apex ; stigma capitate, pubescent. *Legume* (immature) obliquely elliptic, compressed, acute at both ends, 1.8 cm. long, 6.5 mm. wide, apparently only 1-2 seeds developing ; carpophore 2.6 mm. long.

TIBET : Kyi Chu valley near Lhasa, fls. Aug., *H. J. Walton* (type, in Kew Herb.) ; Lhasa, fls. & young frt. Sept., *H. J. Walton* ; Gyantse, fls. July-Sept., *H. J. Walton* (these three were collected during the Tibet Frontier Commission of 1904) ; Kharta, 3700 m., on stony ground, fls. June, *E. Norton* 103 (Mt. Everest Expedition 1922) ; Tsering-me (Dzakar Chu), 4000 m., among rocks above the river, *E. O. Shebbeare* 123 ; Orpa, near Kharta Shika, 3400 m., *L. R. Wager* 238 (the last two collected in flower in July—Mt. Everest Expedition 1933) ; Gobshi, 4000 m., fls. Aug., *F. Spencer Chapman* 228.

CHINA : Szechuan, Ta-tsien-lou (Kiala District), *J. A. Soulié* 759, 797.

The plants collected by Walton cited above were recognised by Sir D. Prain as a new species for which he proposed the name adopted.

Aster Gouldii *C. E. C. Fischer*, sp. nov. [Compositae] ; ab *A. molliusculo* Wall. foliis minoribus linearibus, capitulis minoribus, bracteis involucribus hirsutioribus papilloisque, achaeniis albidis differt.

Perennial, much branched from the base ; rootstock vertical, woody, up to 10 cm. long ; branches few to numerous, woody below in older plants, up to 20 cm. high, pubescent, sometimes purplish, leafy to near the capitula. *Leaves* sessile, linear-spathulate, obtuse, 5-30 mm. long, 1-4 mm. wide, hispid, midrib prominent below, lateral nerves very obscure. *Capitula* solitary, terminal on the branchlets, rayed, 1 cm. diam., or up to 3.5 cm. including the ligules. *Involucre* hemispheric ; bracts usually 2-seriate, sometimes a few below, equal or the outer somewhat shorter, linear or ensiform, acuminate, membranous, often with very narrow scarious margins, hispid and minutely papillose without, 3-6 mm. long. *Receptacle* flat, pitted, the edges of the pits more or less papillose. *Ray florets* many, ligulate ; *ovary* oblong-obcuneate, 1-1.6 mm. long, appressed

hairy; *pappus* white or brownish, of barbellate hairs 2.5–3 mm. long, sometimes a few very short outside; *ligules* strap-shaped, apex rounded, 1–2 cm. long; style short, lobes short, flat. *Disk florets* very many, tubular, yellow; *ovary* and *pappus* as in the ray florets; *corolla* 3.5 mm. long, lobes short, triangular, acute, sparingly bristly without in bud, glabrous later; *anthers* 1.5–2 mm. long, terminated by a distinct, lanceolate, acute, empty appendage; *style* arms flat or slightly plano-convex, acute, minutely puberulous. *Achenes* obovate, compressed, apex rounded, base acute, 2–2.2 mm. long, 1–1.2 mm. wide, dark brown, subpatently white-hairy; *pappus* reddish, 2.6–4 mm. long.

TIBET: Mountain behind Drepung, north-west of Lhasa, 5400 m., fls. & frt. Sept., *F. Spencer Chapman* 21 (type, in Kew Herb.); Ralung, 4150 m., fls. Aug., *F. Spencer Chapman* 1053; above Singma Khangchung, 3550 m., fls. Aug., *F. Spencer Chapman* 1175; south of Rakhas Tal, 4450 m., fls. and frt. Sept., *R. Strachey* and *J. E. Winterbottom* 3 (1754); Tingri, 45 miles north-west of Everest, fls. July, *A. F. R. Wollaston* 106, 113 (Mount Everest Expedition 1921); Numa and Gyantse Hills, fls. Sept., *H. M. Stewart*; Lhasa, 3700 m., fls. Aug.–Sept., *L. A. Waddell*.

Saussurea Chapmanii C. E. C. Fischer, sp. nov. [Compositae]; *S. Kunthianae* C. B. Clarke proxima, sed caule elongato folioso, foliis majoribus subtus haud albo-tomentosis recedit.

Herb; stems slender, solitary or twin, 10–22 cm. long, glabrous or sparsely cottony upwards, base clothed with the dark, fibrous remains of old petioles. *Leaves* mostly radical, few to many, narrowly oblong or oblanceolate-oblong in outline, 4–18 cm. long, 1.3–3 cm. wide, deeply runcinate-pinnatifid to 1–3 mm. from the midrib, lobes opposite, especially towards the acute, apiculate apex, or alternate, very varied in shape and size, from narrow triangular-falcate to semi-circular, up to 1.2 cm. broad and long, decreasing in size from apex to base, margins apiculate-lobulate or dentate, midrib rather broad and usually striate below, glabrous or sparsely crispately hairy on the midrib and margins above, and on the midrib and nerves below; petioles 1–7 cm. long; cauline leaves 1 or 2, similar but smaller. *Capitulum* solitary at the end of the stem, campanulate, 2–2.5 cm. long, 1.5 cm. diam., sometimes with 1 or 2 foliaceous bracts at the base. *Involucral bracts* 5–6-seriate, outer oblong-lanceolate, acute, 1 cm. long, 4 mm. wide, stiffly chartaceous, yellowish brown and more or less plicate in the lower half, membranous, dark-green or purplish-olivaceous (when dry) upwards, the terminal part often reflexed, the next 2 or 3 rows dark purple in upper half, inner becoming more scarious, innermost scarious throughout, up to 1.9 cm. long, 3 mm. wide, acute or acuminate, apex more or less apiculate-denticulate. *Receptacle* flat, bristly; bristles pale-brown, smooth, in groups of unequal length, 7–10 mm. long. *Florets* numerous. *Ovary* oblong, truncate, crowned with a

minute, fleshy, lobulate ring, compressed, 3.5–4.5 mm. long with an apical projection 0.7–1 mm. long terminated by a cup into which the style articulates, glabrous. *Pappus* 2-seriate, brown, outer bristles slender, inner stout and somewhat longer, up to 1.8 cm. long, all plumose. *Corolla* purple, 0.5 mm. diam. for about 1 cm., slightly expanded at the base to accommodate the apical projection of the ovary, then rather abruptly widened to 1.5 mm. diam. for 3–4.5 mm.; lobes linear, acute, 4.5–7 mm. long. *Anthers* purple, 6–7 mm. long excluding the 2–3 mm. long, white-hairy tails. *Style-arms* slender, acuminate, 2.5–4 mm. long, very minutely papillose. *Achenes* not seen.

TIBET : near Gantsa, 3700 m., fls. Aug., *F. Spencer Chapman* 262, 266 (type, in Kew Herb.); road from Natu La to Champitang, 4200–3700 m., fls. Aug., *F. Spencer Chapman* 428; Champitang, 3700 m., fls. Aug., *F. Spencer Chapman* 1113; Phari, 4200 m., fls. Aug., *F. Spencer Chapman* 1176; Yatung, 27° 51' N., 88° 35' E., *H. E. Hobson*.

None of the labels bears any further details, and the colours given above are taken from the dried specimens.

XLVI—NOTES ON XYLOCARPUS. H. N. RIDLEY.

The genus *Xylocarpus* Koen. comprises about seven species of seashore trees occurring chiefly in mangroves, but in some cases on more sandy spots in maritime localities, in the old world tropics, ranging from the east coast of Africa to Polynesia. There has been a good deal of confusion in the names of the two commonest species, *X. Granatum* Koen. and *X. moluccensis* (Lam.) Roem., owing to descriptions published by Lamarck based on Rumphius' very bad drawings and descriptions of the Amboina species. The confusion was cleared up by Merrill, Interpr. Rumph. Herb. Amboin. 306 (1917). Besides the two common species and *X. gangeticus* Parkinson, I find three other undescribed species.

X. Granatum Koen. [*Nireh batu* (Malay). *Carapa obovata* Bl. *C. carnosulus* Zoll. et Mor. Nat. en Geneesk. Arch. Neerl. Ind. **2**, 582 (1845)] occurs in the Sunderbuns, Burmah, Mergui, Ceylon, Siam, Cochinchina, Malay peninsula, Borneo, Celebes, Java, Philippines, Papua (a variety), Australia, Fiji, Tonga and other Polynesian islands, Madagascar and Seychelles. I have not seen any specimen from East Africa, but Sim, Forest Flora Portuguese E. Africa, p. 27, t. xvi (1909), figures a plant under the name *X. moluccensis* which has the stamen tube of *X. Granatum* with retuse lobes, not the dentate form of *X. benadirensis* Matt. He records it from tidal mud in all the rivers at and north of Quelimane.

Xylocarpus benadirensis *Mattei* in Boll. Ort. Bot. Palermo, **7**, 99 (1908), descr. amplif. *Ridley*.

Carapa moluccensis Lam. sec. Oliv. Fl. Trop. Afr. **1**, 337 (1868), non Lam.

A *X. Granato* Koen., cui affinis, foliis tenuioribus, tubi staminei lobis unidentatis nec bifidis, pericarpio crassiore, seminibus vix acutangulis differt.

Arbor 7-metralis, ramosus, caulibus 2 vel pluribus, cortice laevi. *Folia* 4 cm. longa; foliola 4, coriacea, oblanceolata vel obovata, apicibus obtusis, ad bases attenuata, basibus inferiorum saepe inaequilateralibus, 7–11 cm. longa, 3–4 cm. lata, nervis circiter 10-paribus gracilibus inarcuantibus, secundariis et reticulationibus aequae conspicuis; petioli 2 mm. longi. *Paniculae* 4–5 cm. longae, patentes, ramis paucis dissitis 2 cm. longis, pedicellis 1 cm. longis. *Bractee* minutissimae, acutae, caducae. *Sepala* 4 (raro 5), ovato-rotundata, 1 mm. longa. *Petala* 4, oblonga, obtusa, alba vel pallide rosea, 4 mm. longa. *Tubus staminalis* 3.5 mm. longus, campanulatus, lobis 8 truncatis haud retusis dentibus acutis singulis, antheris oblongis sessilibus introrsis aurantiacis. *Ovarium* in disco rubro immersum, 4-loculare, ovulis 2 pro loculo. *Stylus* superne attenuatus, subconicus, stigmate discoideo. *Fructus* magnus, globosus, 12–20 cm. crassus, 4-valvis, pericarpio carnosio crasso albo-punctato. *Semina* irregularia, suberosa.

MADAGASCAR. Nossi Bé Island, *Boivin*. Aldabra Island, *Fryer* 72.

ITALIAN SOMALILAND. Benadir Coast, Jumbo (Goscia), by the Juba River, *Macaluso* (type).

KENYA COLONY. Vanga, on creek-banks especially where water flows into the swamps, but also in pure salt creeks, flowers January, *R. M. Graham* in For. Herb. no. 2236.

ZANZIBAR. Without locality, *J. H. Vaughan* 1798. Makongwe Island, Pemba, in mangrove formations, *Greenway* 2732.

PORTUGUESE EAST AFRICA. River Luabo, at mouth of R. Zambezi, *Kirk*. Savana River, common in tidal waters, *Honey* 655. Beira, *Kuntze*. In mangrove at Catembe opposite Lorenzo Marques on the Rio do Espirito Santo and at Matolla River Bridge, 8 miles from Lorenzo Marques, *Muir* 4809.

Native names: *Mfava* (Honey); *Mkomafi* (Swahili, Graham).

The flowers of this were not described by Mattei, who only had the fruit. *Kirk* describes the tree as 20 feet tall, usually branchy, often 2 or more stems from one rootstock, twigs red-brown, bark smooth or yellowish. *Greenway* says the timber newly cut is pink. It grows among the mud near the coast. The base of the trunk divides into many flat plates which radiate towards the roots coming from the stem (*Kirk*). In this the tree resembles *X. Granatum* the bark of which however is flaky, not smooth. The pericarp of the fruit is thicker and the seeds less distinctly angled. *Mattei* describes the fruit as 20 cm. through.

Xylocarpus minor *Ridley*, sp. nov., a *X. Granato* Koen., cui affinis, foliis minoribus oblanceolatis, floribus minoribus, stylo conico, fructu multo minore differt.

? *Carapa borneensis* Becc. Nelle Foreste di Borneo, 574 (1902).

Arbor 7.5-metralis. *Foliola* rigide coriacea, oblanceolata, obtusa, apicibus rotundatis vel emarginatis, basibus angustatis, 6–9 cm. longa, 2.5 cm. lata, nervis tenuibus 7-paribus; petioli crassi, 3 mm. longi. *Paniculae* 1 cm. longae, pauciramosae, pauciflorae. *Bracteae* minutissimae, ovatae, acutae. *Pedicelli* 1 mm. longi. *Sepala* 4, ovata, obtusa, 2 mm. longa. *Petala* 4, oblonga, obtusa, alba, 3 mm. longa, 1 mm. lata. *Tubus staminalis* cylindricus, lobis 8 brevibus emarginatis, antheris 8 ellipticis. *Ovarium* in disco conico immersum, stylo crasso superne attenuato, stigmatе peltato. *Fructus* globosus, pericarpio 3 mm. crasso.

SIAM. Trang, Pungah, *For. Dept. Siam* 723.

MALAY PENINSULA. Malacca, Maingay, Griffith (type). Perak, Scortechini.

BRIT. N. BORNEO. Gundangan, near the river, Goklin in *B.N.B. For. Dept.* 2232: "Tree, 25 ft. high, 30 ft. girth. Flower white."

This tree is known to the Malays as *Nireh Bunga* as opposed to *Nireh Batu* (*X. Granatum* Koen.). It was described by me in the Flora of the Malay Peninsula as *Carapa obovata* Bl. (*X. Granatum* Koen.). *X. minor* Ridl. is absent from Java. It is less common than *X. Granatum* and not valued as a timber, being a rather smaller tree with narrower stiffer oblanceolate leaves, smaller flowers and fruit the size of an orange only. The ovary included in the disc is conic, tapering to the mushroom-shaped stigma. In *X. Granatum* the disc is stout with a broad top and a short cylindric style, the stigma much broader and ribbed. The staminal tube is very similar in both species but in this the lobes are rather more deeply cut. *Carapa borneensis* Becc. (no. 3995 of his collection) from Sarawak may be this species, but I have seen no specimen and the description is quite inadequate.

***Xylocarpus parvifolius* Ridley, sp. nov., a *X. gangetico* Parkinson, cui affinis, foliis perparvis, floribus multo minoribus in paniculis brevibus compactis differt.**

Arbor 4-metralis, ramis gracilibus, ramulis gracillimis. *Folia* 6 cm. longa; foliola 4, subcoriacea, elliptica, obtusa, basibus brevissime cuneatis saepe obscure inaequilateralibus, 4–6 cm. longa, 2–3 cm. lata, nervis tenuibus 6-paribus, secundariis et reticulationibus aequae conspicuis; petioli 1 mm. longi. *Paniculae* 2–3 cm. longae, racemiformes, ramis 3 mm. longis. *Bracteae* minutissimae, lanceolatae, acuminatae. *Pedicelli* 2 mm. longi. *Sepala* 4, ovata, obtusa, 1 mm. longa. *Petala* 4, oblonga, obtusa, 4 mm. longa. *Tubus staminalis* globoso-urniformis, basi angustatus, lobis brevibus oblongis truncatis integris, antheris 8 oblongis. *Discus* cum ovario crassus, cylindricus, papilloso-costatus. *Stylus* crassus, conicus, stigmatе magno discoideo. *Fructus* (immaturus) globosus, 4 cm. crassus, 4-valvis, pustulosus.

SIAM. Koh Lak Laiburi, April 1919, *Hamid* in *C. F. Field* no. 3804 (flowers). Patenam, tidal swamps, 10 April 1924, *Kerr* 8198 (fruit): "Small tree, 4 m. high."

Very distinct in its small leaves and short dense panicles, and its nearly globose stamen-tube with short broad processes. The flowers are about half the size of those of *X. gangeticus* Park.

X. gangeticus *Parkinson* occurs in Bengal, where it is apparently rare, and in Burmah and the Andamans.

X. moluccensis (*Lam.*) *Roem. sec. Merr.* [*Carapa indica* Juss. in *Dict. Sci. Nat.* 7, 32 (1817). *X. Forstenii* Miq. in *Ann. Mus. Bot. Lugd.-Bat.* 4, 62 (1868), probably. *X. Granatum* Miq. l.c. is certainly this species. *X. mekongensis* Pierre, *Fl. For. Cochinch. t.* 359 (1897).]

This tree seems to prefer sandy beaches to the tidal mud of the mangroves, which is perhaps the reason why it is so scarce in the Malay Peninsula where much of the shores is tidal mud. The fruit is only as large as an orange and the thinner ovate acuminate leaves, green when dry, and the lax panicle, readily distinguish it. The staminal tube has an undulate margin. It occurs in Burmah, Siam and Cochinchina, Malay Peninsula, Malacca, Pulau Tioman and Terutau island, Karimata, Philippines, Amboina, Buru, Ceram, Timor-Laut, Papua, Fiji, Samoa, Tonga and other islands, Madagascar, Nossibé, Aldabra, Seychelles, East Africa at Mombasa.

Xylocarpus australasica *Ridley*, sp. nov., a *X. moluccensi* (*Lam.*) *Roem.*, cui affinis, foliis multo minoribus, paniculis brevioribus compactis, floribus multo minoribus differt.

Arbor. Folia 6–7 cm. longa; foliola 4–6, opposita, subcoriacea, ovata, obtusa, basibus rotundatis, vel lanceolata apicibus et basibus angustatis, 6.5–9 cm. longa, 4.5–5 cm. lata, sicca viridescens, nervis gracilibus 6-paribus apicibus furcatis utrinque elevatis; petioli crassi, 2 mm. longi. *Panicula* brevis, racemiformis, dense multiflora, 2–4 cm. longa, ramis 6 vel 7 gracilibus 5 mm. longis. *Pedicelli* 2 mm. longi. *Calyx* patelliformis, vix 1 mm. longus, dentibus minutis 5. *Petala* oblonga, obtusa, 2 mm. longa. *Tubus staminalis* basi dilatatus, superne cylindricus, lobis truncatis cuspidatis, antheris oblongis majusculis. *Discus* brevis, crassus. *Stylus* breviusculus, crassus, cylindricus. *Stigma* magnum, discoideum.

QUEENSLAND. Howick's Group, *F. Mueller*. Salt water creek near McAdam Range, *F. Mueller*. Cairn Cross islands, *F. Mueller* (type). Endeavour River, *A. Cunningham* 157. Flowers July–August.

This plant is allied to *X. moluccensis* *Roem.*, but very distinct in the small leaves, dense short panicle, much smaller flowers. The petals are spotted on the back, apparently with glandular dots. The staminal tube resembles that of *X. moluccensis* but is dilated over the disc and narrowed above. *Cunningham's* specimens have

lanceolate leaves narrowed at both ends, but ovate forms occur on the same spray. The calyx in these specimens is more distinctly lobed also.

EXCLUDED SPECIES.

X. guineensis Roem. Syn. Hesp. 124, *X. procerus* Steud. Nom. ed. 2, 2, 793 and *X. touloucouna* Steud. l.c. are all *Carapa procera* DC. Prodr. 1, 626.

XLVII—CONTRIBUTIONS TO THE FLORA OF TROPICAL AMERICA: XXXVI.*

PLANTAE HINTONIANAE: VIII.*

NEW MEXICAN GESNERIACEAE. C. V. MORTON (Washington).†

Phinaea multiflora Morton, sp. nov., foliis ovatis vel rhombeis simpliciter dentatis supra parce pilosulis, floribus numerosis, pedicellis albido-villosis, calycis lobis magnis, corollis externe pilosis, antheris apice connatis, ovario villosis.

Herba, caulibus haud ramosis circiter 13 cm. longis pilosulis. *Folia* pauca, opposita, subaequalia, petiolis usque ad 2.2 cm. longis pilosis; laminae ovatae vel rhombeae, usque ad 8 cm. longae et 5 cm. latae, acutae, basi obtusae vel rotundatae, tenuiter membranaceae, supra medium simpliciter dentatae, supra parce pilosulae, subtus praecipue in venis pilosulae, venis primariis 5-7-jugis. *Flores* numerosi, apice caulis fasciculati, pedicellis circiter 1.5 cm. longis albido-villosis. *Calycis* *tubus* brevissimus, villosus, lobis oblongis 6 mm. longis 2.7 mm. latis viridibus integris obtusiusculis utrinque pilosis. *Corolla* alba, rotata, circiter 1 cm. longa, tubo circiter 6 mm. longo externe piloso, lobis aequalibus rotundatis externe glandulas numerosas sessiles gerentibus. *Stamina* 4, filamentis contortis circiter 3 mm. longis gracilibus glabris, antheris apice connatis circiter 1 mm. longis, loculis oblongis discretis. *Ovarium* (pars libera) villosum, stylo 3 mm. longo basi puberulo, stigmate stomatomorpho, disco nullo.

STATE OF GUERRERO. Vallecitos, District of Montes de Oca, oak woods, 24 July, 1937, *Hinton* 10626 (type in Kew Herb.).

No species of this genus has been known previously from Mexico.

Achimenes (Dicyrta) brevifolia Morton, sp. nov., herba foliorum marginibus exceptis omnino glabra, foliis late ovatis subsessilibus chartaceis, calycis lobis brevibus, corollae lobis eroso-denticulatis, dentibus margine glanduliferis.

Herba 15-30 cm. alta, caulibus teretibus haud ramosis brunneis circiter 1 mm. crassis. *Folia* opposita vel ternata, subaequalia, subsessilia, petiolis vix 1 mm. longis; laminae late ovatae,

* Continued from K.B. 1938, 168.

† Published by permission of the Secretary of the Smithsonian Institution.

13–26 mm. longae, 8–23 mm. latae, breviter acuminatae, basi rotundatae, supra medium serratae, dentibus 3–5 utroque latere acutis, chartaceae, supra atro-virides, subtus rubescentes, utrinque marginibus scabris exceptis omnino glabrae, venis primariis 3– vel 4–jugis. Flores axillares, solitarii, pedicellis circiter 15 mm. longis gracilibus glabris ebracteatis. Calycis tubus obconicus, 1.5 mm. longus, glaber, lobis 5 ovato-oblongis 1.5 mm. longis 1 mm. latis obtusiusculis glabris. Corolla alba, infundibuliformis, 12 mm. longa, tubo 2.5 mm. lato plus minusve maculato sursum ampliato et 6.5 mm. lato, limbo circiter 10 mm. lato, lobis eroso-denticulatis, dentibus margine glanduliferis. Stamina 4, didynama, basi corollae tubi affixa, filamentis glabris gracilibus 3–4.5 mm. longis, antheris liberis quadratis 0.25 mm. longis 0.5 mm. latis, loculis contiguus haud confluentibus. Ovarium ellipsoideum, glabrum, stylo 3 mm. longo glanduloso-puberulo, stigmathe stomato-morpho, disco annulari glabro integro.

STATE OF GUERRERO. Pasi6n, District of Montes de Oca, 1000 m., oak and pine forest, 5 Oct., 1937, *Hinton* 10766 (type in Kew Herb.).

The most closely related species is *Achimenes fimbriata* Rose, which is similar in its nearly glabrous leaves and erose-denticulate corolla lobes with glandular-margined teeth. The two may be distinguished as follows:—

Leaves subsessile, the petiole not over 1 mm. long; leaf blades chartaceous, broadly ovate, almost as broad as long, acutely serrate; calyx lobes ovate-oblong, 1.5 mm. long; style glandular-puberulous.....*A. brevifolia*.

Leaves relatively long-petiolate, the petiole 1–2.5 cm. long; leaf blades thin-membranous, ovate or ovate-lanceolate, about twice as long as broad, obtusely serrate; calyx lobes linear-lanceolate, 2–5 mm. long; style glabrous.....*A. fimbriata*.

***Achimenes flava* Morton* var. *puberula* Morton**, var. nov., a typo foliis subtus rubescentibus in mesophyllo puberulis differt.

STATE OF GUERRERO. San Antonio, District of Montes de Oca, 10 July, 1937, *Hinton* 10583 (type in Kew Herb.).

In the typical form of the species the leaves are pale green beneath and the leaf surface itself is glabrous, the veins however being sparingly pilosulous. Probably not much importance is to be attached to the reddish coloration of the under leaf surface in the var. *puberula*, but the very much closer pubescence, evenly distributed over the whole surface, is distinctive.

***Achimenes (Scheeria) dulcis* Morton**, sp. nov., caulibus minute puberulis, foliis dentatis subtus puberulis, pedunculis solitariis, calycis lobis pilosulis, corollis oblique infundibuliformibus albis ecalcaratis nutantibus, limbo regulari patente, filamentis pilosulis,

* See Morton in K.B. 1936, 13.

antheris quadratis, stigmatē stomatomorpho, disco annulari integro.

Herba tenera, caulibus haud ramosis usque ad 50 cm. longis minute puberulis. *Folia* opposita, subaequalia, longe petiolata, petiolo usque ad 3 cm. longo; laminae ovato-lanceolatae, usque ad 11 cm. longae et 5 cm. latae, acutae, basi obtusae, tenuiter membranaceae, regulariter dentatae, dentibus utroque latere plus quam 30, supra appresso-pilosulae, subtus haud rubescentes, minute puberulae, venis primariis 6-8-jugis. *Flores* solitarii, axillares, pedunculo 2-2.5 cm. longo minute puberulo supra basin bibracteolato. *Calycis* *tubus* late obconicus, 2.5 mm. longus, apice 3 mm. latus, dense pilosulus, lobis oblongo-lanceolatis inaequalibus, majoribus 7 mm. longis et 3 mm. latis, minoribus 5 mm. longis et 2 mm. latis, omnibus acutis integris viridibus utrinque pilosulis. *Corolla* alba, 4-5 cm. longa, in calyce horizontalis, nutans, basi ecalcarata, paullum saccata, tubo basi 5 mm. lato sursum valde ampliato fauce 2 mm. lato externe parce piloso intus glabro, limbo patente 3 cm. lato, lobis subaequalibus circiter 6 mm. longis eciliatis intus glanduliferis. *Stamina* 4, didynama, filamentis brevibus 17 mm. longis pilosulis haud contortis subteretibus, antheris transverse oblongis 1 mm. longis 1.5 mm. latis, loculis orbicularibus. *Ovarium* semi-inferum, placentae lamellis utrinque ovuliferis, disco annulari integro, stylo glabro glandulifero, stigmatē stomatomorpho. *Fructus* capsularis.

STATE OF MEXICO. Luvianos, District of Temascaltepec, on cliffs, 23 Aug. 1935, *Hinton* 8207 (type in Kew Herb.).

From the two previously known species of the subgenus *Scheeria*, *A. mexicana* (Seem.) Fritsch and *A. bella* Morton,* the present species is distinguished by its minutely puberulous rather than hirsute or lanate-villous stems, its white corollas, and its pilosulous filaments.

XLVIII—CONTRIBUTIONS TO THE FLORA OF BURMA : XIV.†

The localities in brackets after the name of the species are those from which it has been previously recorded.

***Clematis Buchananiana* DC.** [Ranunculaceae].

(Temperate Himalaya and Mishmi).

Wa States: Maingling, fls. Dec., *Maung Po Khant* 15235. "Climber with yellow flowers."

***Clematis Kerriana* Drumm. et Craib** [Ranunculaceae].

(Siam).

Wa States: Maingling Ywa, fls. Dec., *Maung Po Khant* 15234. Vernacular name: *Satgyoyit*. "Climber with yellow flowers"

* See Morton in K.B. 1936, 11.

† Continued from K.B. 1937, 440.

Clematis subpeltata Wall. [Ranunculaceae].

This species has been conjoined with *C. smilacifolia* Wall. in Fl. Br. Ind., but there are good grounds for keeping them apart, as pointed out by Craib in Enum. Pl. Siam. The type specimen was obtained at Taong Dong near Ava (Wall. Cat. No. 4684, fls. Nov.)

Wa States : Nanlwe Chaung, fls. Dec., *Maung Po Khant* 15244. Vernacular name : *Kwanyogyi*. "Climber with brown flowers." In some specimens the petiole is attached up to 1 cm. within the basal margin which is then subcordate.

Crotalaria assamica Benth. [Papilionaceae].

(Assam ; Philippines).

Wa States : Nanlwe Chaung, fls. and young frt. Dec., *Maung Po Khant* 15245. "Shrub up to 1.5 m. tall with yellow flowers."

Echinops niveus Wall. [Compositae].

(N.W. Himalayas).

Shan Hills : Pwehla, 1230 m., fls. May, *Collett* 655. S. Shan States : Loilem, above 1250 m., *W. A. Robertson* 4. Upper Burma, *D. Burke* without particulars or number ; Shan name : *Pak lin ngenth*, Burmese name : *Taw soo bin*. Meiktila District : Yedwingtaung, at the foot of Sabapontaung, 1075 m., fls. Oct., blue, *H. C. Smith* 13703.

Senecio nudicaulis Ham. [Compositae].

(W. and E. Himalayas).

Meiktila District : Yedwingtaung, 1075 m., fls. Oct., *H. C. Smith* 16291.

Vernonia cylindriceps C. B. Clarke [Compositae].

(Manipur, China, Indo-China).

Wa States : Laukchan Ywa, fls. Jan., *Maung Po Khant* 15276. "Shrub up to 5 m. tall."

Symplocos spectabilis Brand [Symplocaceae].

(Yunnan).

Wa States : Lwelonkwe taung, *Maung Po Khant* 15296. "Tree up to 8 m. tall, flowers yellow."

Beaumontia breviflora Oliv. [Apocynaceae].

(China).

Thaung District : Thaungyin Valley, fls. March, *J. H. Lace* 4690. Wa States : Nanpan Chaung, fls. April, *Maung Po Khant* 15332. "Creeping with white flowers."

Paravallaris macrophylla Pierre [Apocynaceae].

Dr. A. H. G. Kerr has pointed out that this is the correct identification for the plant that has been variously named *Trachelospermum anceps* Dunn et Will. in Kew Bull. 1920, 343 ; *Vallaris arborea* C. E. C. Fischer in Kew Bull. 1925, 92, and *Vallaris anceps* (Dunn et Will.) C. E. C. Fischer in Kew Bull. 1931, 28. It has also

recently been placed in *Kibatalia* by Woodson. An additional locality is Tavoy : Kalamunsi Chaung, frt. Jan., *R. N. Parker* 2440.

Gentiana serra *Franch.* [Gentianaceae].

(W. China).

Wa States : Laukchan Ywa, fls. Dec., *Maung Po Khant* 15259.

Tournefortia Roxburghii *C. B. Clarke* [Boraginaceae].

(Chittagong).

Maymyo plateau, 1075 m., fls. Aug., *J. H. Lace* 4142. Wa States : Nanhan Ywa, Nankaw Chaung, fls. Dec., *Maung Po Khant* 15211. Shan name : *Marnan*. "Shrub with yellow flowers."

Trichodesma sinicum *Brand* [Boraginaceae].

(Yunnan).

Wa States : Laukchan Ywa, fls. Jan., *Maung Po Khant* 15275. "Tree up to 6 m. high ; flowers white."

Hypoestes triflora *Roem. et Sch.* [Acanthaceae].

(N.E. Himalaya ; W. China).

Wa States : Katmaw taung, fls. white, Dec., *Maung Po Khant* 15219. Shan name : *Maukhaung tein*.

Phlogacanthus pubinervius *T. And.* [Acanthaceae].

(Sikkim to Assam).

Wa States : Minesaw, fls. brown, Jan., *Maung Po Khant* 15289.

Ceratanthus calcaratus (*Hemsl.*) *G. Taylor* [Labiatae].

(China).

S. Shan States, fls. March–April, *R. W. MacGregor* 841.

Craniotome versicolor *Reichb.* [Labiatae].

(Himalayas from Simla to the Khasia Hills).

Meiktila District : Thauangbaw-yo, 615 m., fls. Oct., *H. C. Smith* 16272. Vernacular name : *Ziyo*.

Pogostemon Wattii *C. B. Clarke* [Labiatae].

(Manipur).

Wa States : Linglaing taung, fls. Dec., *Maung Po Khant* 15214. "Shrub with purple flowers. Leaves used medicinally by the Wa people."

XLIX—NEOPORTERIA AND CHILENIA. A. A. BULLOCK.

The genus *Neoporteria* was established by Britton and Rose (Cactaceae, 3, 94 : 1922), to accommodate seven species of *Cactaceae* found along the coast and in the highlands of Chile. All had been previously referred to the aggregate genus *Echinocactus*.

Britton and Rose stated that the type-species was *Neoporteria subgibbosa* (Haw.) Britt. et Rose, and unless it can be shown that this statement was due to a taxonomic or some other error, their

choice must be accepted, and the name *Neoporteria* will remain permanently attached to *Echinocactus subgibbosus* Haw.

The generic diagnosis given by Britton and Rose includes the phrase, "stigma-lobes cream-colored to reddish," whereas in the key two species, including the type, are separated on the character "stigma-lobes greenish." It is evident that Britton and Rose were well aware of more variation in the colour of the stigma-lobes than is mentioned in their generic description, and a slight amendment, such as the insertion of the word "usually" is all that is required to cover the type. In these circumstances there is no justification for discarding Britton and Rose's type.

It is clear that Backeberg (Blätter Kakteenforsch. 1935, pt. 6 [p. 5], et in Backeb. et F. M. Knuth, Kaktus-ABC, 258 : 1935), has taken the opposite view. In his "Blätter" he says of *Neoporteria*, "The styles are all cream coloured to pink" and in the "Kaktus-ABC" he includes among others, five of the species enumerated by Britton and Rose, and relegates the two with green stigma-lobes to the new genus *Chilenia* Backeb. (l.c. 299), which also includes two species which Britton and Rose had either reduced or regarded as doubtful, and three new species.

Chilenia Backeb. is thus a superfluous name for *Neoporteria* Britt. et Rose, and *Neoporteria* sensu Backeb. requires a new generic name.

The following enumeration includes the relevant synonymy :—

1. **Neoporteria** *Britt. et Rose*, Cactaceae, **3**, 94 (1922), emend. Bullock.—*Chilenia* Backeb. in Backeb. et F. M. Knuth, Kaktus-ABC, 299 (1935), et Blätter Kakteenforsch 1936, p. 3 [p. 5].

This genus includes *N. subgibbosa* (Haw.) Britt. et Rose, the type-species, and *N. chilensis* (Hildm.) Britt. et Rose, and such other species of *Chilenia* Backeb. as may be taxonomically distinct from these two.

2. **Nichelia*** *Bullock*, nom. nov.—*Neoporteria* Britt. et Rose emend. Backeb. Blätter Kakteenforsch. 1935, pt. 6 [p. 5], et in Backeb. et F. M. Knuth, Kaktus-ABC, 258 (1935).

Nichelia Jussieui (*Monville*) *Bullock*, comb. nov.—*Echinocactus Jussieui* Monville in Salm-Dyck, Cact. Hort. Dyck. 1849, 170 (1850).—*Neoporteria Jussieui* (Monville) Britt. et Rose, Cactaceae, **3**, 96 (1922); Backeb. in Backeb. et F. M. Knuth, Kaktus-ABC, 259 (1935).

The writer has chosen this species as lectotype of the generic name, not because it agrees better with the generic characters than any other species, but because it is the oldest species to which Backeberg and Britton and Rose assign the same limits.

Nichelia nidus (*Söhlrens*) *Bullock*, comb. nov.—*Echinocactus nidus* Söhlrens in K. Schum. Monatsschr. Kakteenk. **10**, 122 (1900).—

*Anagram of *Chilenia*.

Neoporteria nidus (Söhrens) Britt. et Rose, Cactaceae, **3**, 94 (1922) ; Backeb. in Backeb. et F. M. Knuth, Kaktus-ABC, 260 (1935).—*Neopteria senilis* (Philippi) Backeb. *l.c.* 262.

Echinocactus nidus and *E. senilis* are now generally regarded as conspecific but Backeberg treats them as different species.

Nichelia occulta (Philippi) Bullock, comb. nov.—*Echinocactus occultus* Philippi, Fl. Atac. 23 (1860).—*Neoporteria occulta* Philippi (Britt. et Rose, Cactaceae, **3**, 95 (1922) ; Backeb. in Backeb. et F. M. Knuth, Kaktus-ABC, 261 (1935).

Nichelia nigricans (Linke) Bullock, comb. nov.—*Echinopsis nigricans* Linke in Allg. Gartenz. **25**, 239 (1857).—*Neoporteria nigricans* (Linke) Britt. et Rose, Cactaceae, **3**, 95 (1922) ; Backeb. in Backeb. et F. M. Knuth, Kaktus-ABC, 261 (1935).

Nichelia fusca (Mühlenpfordt) Bullock, comb. nov.—*Echinocactus fuscus* Mühlenpfordt in Allg. Gartenz. **16**, 10 (1848).—*Neoporteria fusca* (Mühlenpfordt) Britt. et Rose, Cactaceae, **3**, 99 (1922) ; Backeb. in Backeb. et F. M. Knuth, Kaktus-ABC, 259 (1935).

Backeberg places eight other species under *Neoporteria* ; one of these (*N. senilis*) has been dealt with already under *Nichelia nidus*. Of the remaining seven, one, *Echinocactus Aspillagai* was described by Söhrens in 1929 ; the remainder were disposed of by Britton and Rose as follows :—

1. *Echinocactus ambiguus* Hildm. (1898)—in synonymy under *Copiapoa cinerascens* (Salm-Dyck) Britt. et Rose, Cactaceae, **3**, 88 (1922).
2. *Echinocactus Fobeanum* Mieckley (1907)—a doubtful species, possibly belonging to the genus *Copiapoa* Britt. et Rose (*l.c.* 89).
3. *Echinocactus Kunzii* Först. (1846)—a doubtful species, possibly belonging to *Neoporteria* Britt. et Rose, sens. lat. (*l.c.* 99). Since the colour of the stigma is not given, it is not possible to decide whether this plant should be placed under *Nichelia* or *Neoporteria* Britt. et Rose, sens. restrict.
4. *Echinocactus Reichei* K. Schum. (1903)—as *Malacocarpus Reichei* (K. Schum.) Britt. et Rose (*l.c.* 191).
5. *Echinocactus napinus* Philippi (1872)—as *Malacocarpus napinus* (Philippi) Britt. et Rose (*l.c.* 191).

Owing to lack of material, the writer is not in a position to judge the correctness of the opposing views expressed by Britton and Rose and Backeberg, and the new combinations under *Nichelia* will not be made until the taxonomic position of the species concerned has been finally settled.

L—FOUR NEW SPECIES OF VERNONIEAE COLLECTED BY GLAZIOU IN BRASIL. W. R. PHILIPSON.

Eremanthus curumbensis Philipson, sp. nov. *Herba* perennis, rhizomate tuberoso, caule simplici striato tomentoso. *Folia* sessilia

vel alato-petiolata, caulis basi congesta; lamina obovata, obtusa, usque ad 15×8 cm., utrinque tomentosa, margine serrato, venulis subtus prominulis. *Pedunculus* 30 cm. longus, glomus 2×4 cm. solitarium gerens. *Capitula* 2×1 cm.; involucri squamae circa 20 imbricatae, lanceolatae, acutae, fuscae. *Flosculi* pauci; corolla tubulosa 12 mm. longa, lobis longis angustatis; antherae basi auriculatae; styli rami lineares. *Achenia* 8 mm. longa, cylindrica, 5-costata, tomentosa; pappus duplex, setis exterioribus 1 mm. longis, persistentibus, interioribus 15 mm. longis, planis, deciduis.

BRASIL: State of Goyaz, valley of the Rio Curumba, in the plains between the mountains, *Glaziov* 21645 (type in Kew Herb.).

Similar in habit to *E. scapigerus* Baker ex Mart. but differing in the shape and margin of the leaf and in the details of the glomerules.

Eremanthus pinnatifidus *Philipson*, sp. nov. *Herba* perennis, caule striato glabro foliato. *Folia* petiolata; petiolus usque ad 3 cm. longus; lamina ovata 20×10 cm., leviter tomentosa, valde pinnatifida, loborum marginibus sinuatis. *Glomera* 2×3 cm., 3–10 ad ramorum apices in corymbos disposita. *Capitula* 2×0.5 cm.; involucri squamae circa 15, imbricatae, lanceolatae, acutae, rosaceae, nitentes. *Flosculi* pauci; corolla tubulosa, 20 mm. longa, lobis angustatis; antherae auriculatae; styli rami lineares. *Achenia* turbinata, tomentosa; pappus duplex, setis exterioribus 2 mm. longis persistentibus, interioribus 15 mm. longis deciduis.

BRASIL: State of Rio Janeiro, environs of Rio de Janeiro, *Glaziov* 14033 (type in Kew Herb.); 12812.

This species is very distinct in the genus because of its deeply pinnatifid leaves. In this respect it approaches closely to the monotypic genus *Pithecoseris*, which differs from *Eremanthus* only in the elongated common receptacle.

Proteopsis insculpta *Philipson*, sp. nov. *Frutex* ramis robustis foliatis. *Folia* sessilia, basi vaginata; lamina 12×2.5 cm., ovato-lanceolata, acuta utrinque cinereo-tomentosa, costa nervisque subtus canaliculatis, margine integro. *Capitula* 4–5, 2×2 cm., subsessilia et in inflorescentiam terminalem foliis circumdatam aggregata; involucri squamae numerosae, lanceolatae, acutae, fuscae. *Flosculi* numerosi; corolla tubulosa, 12 mm. longa, lobis longis angustatis; antherae basi auriculatae; styli rami lineares. *Achenia* cylindrica, 10-costata; pappi setae copiosae, 1-seriatae 10 mm. longae, planae, deciduae.

BRASIL: State of Rio Janeiro, environs of Rio de Janeiro and D'Ouro Preto, *Glaziov* 14974 (type in Kew Herb.).

This species closely resembles *P. argentea* Mart. et Zucc. ex Sch. Bip. in its leaves and tomentum, but is very distinct because of its more woody and branched stems, and its involucre bracts which lack spreading spines.

Proteopsis Ekmaniana Philipson, sp. nov. *Frutex* 2–3 m. altus, omnino dense lanatus, ramis robustis foliatis. *Folia* breviter petiolata, basi vaginata; lamina 25×8 cm., ovata, ad apicem acutam angustata, margine integro, nervis venulisque subtus reticulatis prominulis. *Pedunculi* axillares usque 20 cm. longi, bracteas 2–3 gerentes; bracteis capitula terminalia cingentibus. *Capitula* 2×2 cm.; involucri squamae numerosae, acutae, fuscae. *Flosculi* numerosi, hermaphroditi; corolla tubulosa, 18 mm. longa, lobis longis angustatis ad apicem tomentosis; antherae basi auriculatae; styli rami lineares. *Achenia* 4 mm. longa, cylindrica, 10-costata; pappi setae 14 mm. longae, planae, deciduae.

BRASIL: State of Goyaz, Caxoeira da Vargem Grande (Serra da Baloza), between rocks, *Glaziou* 21668 (type in Kew Herb.). Flowers rose coloured.

This species is very distinct in habit but shows affinity to *P. Sellovii* Sch. Bip. In floral characters it is, perhaps, closest to *Sipolisia lanuginosa* Glaziou ex Oliv. which also has hairy tips to its corolla lobes. The supposed monotypic genus *Sipolisia* differs in no essential characters from *Proteopsis argentea* Mart. et Zucc. ex Sch. Bip. (the type species of the genus *Proteopsis*) and approaches extremely closely to *P. Sellovii* in habit. These two genera are best united so I propose the necessary combination **Proteopsis lanuginosa** (*Glaziou ex Oliv.*), comb. nov.

The present species is named in honour of E. L. Ekman who determined the specimen as a new species of *Sipolisia*.

LI—CHILENIOPSIS AND BRIDGESIA. A. A. BULLOCK.

The name *Bridgesia* Backeb. was first published as a *nomen nudum* in 1934 (Backeb. *Blätter Kakteenforsch.* 1934, pt. 3 [p. 5]), as follows:—

“ [Genus] 71. *Bridgesia* Bckb. (*Bridgesia* (Echus., Lob.) Cumingii).” It may be assumed that the genus *Bridgesia* was erected with *Echinocactus Cumingii* Hopffer in *Allg. Gartenz.* 11, 225 (1843), as the type. This species was placed under *Lobivia* Britt. et Rose by the authors (*Cactaceae*, 3, 39: 1922) of that genus.

In *Blätter Kakteenforsch.* 1935, pt. 12 [p. 1], Backeberg gave a brief description of *Bridgesia*, and cited *Chileniopsis* Backeb. as a synonym. The latter name had not previously appeared in print. He says, “The genus was named after Thomas Bridges who collected in the Andes of South America just one hundred years ago. He brought over *Echinocactus* (*Spegazzinia*) *Cumingii*, for which this genus was first established (. . .) till its relationship could be cleared up. Instead of his plant, ‘*Echinocactus villosus*’ is to-day placed in this new genus.”

The first point which emerges is that *Bridgesia* of 1934 is not synonymous with *Bridgesia* of 1935: the first is a *nomen nudum* and is a synonym of *Spegazzinia* Backeb. (in *Kakteenfreund*, 2,

Nos. 9, 10 : 1933, et *Blätter Kakteenforsch.* 1934, pt. 4 [p. 3], et in Backeb. et F. M. Knuth, *Kaktus-ABC*, 298 : 1935) ; the second is based on *Cactus villosus* Monville (*Hort. Univ.* 1, 223 : 1839) which was regarded as a doubtful species, probably belonging to their genus *Matucana* by Britton and Rose (*Cactaceae*, 3, 103 : 1922). Both names are homonyms of *Bridgesia* Hook. (*Bot. Misc.* 2, 222 : 1832), and must be rejected.

In the *Kaktus-ABC*, which was published on 31 Dec. 1935, Backeberg (p. 283) published the new generic name *Chileniopsis* citing as a synonym "*Bridgesia* Bckb. nom. nud." As Backeberg cites *Cactus villosa* Monville as one of the constituent species, he evidently intended the *Bridgesia* of 1935 as the synonym. No reason was given for the name-change, which, however, was nomenclaturally correct.

LII—MISCELLANEOUS NOTES.

BERNARD DEARMAN BURTT.—It is with the deepest regret that we record the death of Mr. B. D. Burtt, Botanist on the staff of the Department of Tsetse Research, Tanganyika Territory, who, together with his chief, Mr. C. F. M. Swynnerton, was killed in an aeroplane accident on 9th June, 1938, whilst on a survey flight in the neighbourhood of Singida, Tanganyika Territory.

Burt was the son of the late Dr. A. H. Burtt, himself a botanist, and was born at York on 14th June, 1902. He was educated at the Friends' School, Ackworth and at University College, Aberystwyth. Always fond of nature, he won for several years in succession the Prize for Natural History open for competition among the Friends' Schools in this country. At College he pursued biological studies for two years, leaving in 1922. Burtt then spent a few years working in the Herbarium of the Royal Botanic Gardens, Kew, some of which time he was assisting his cousin, Dr. J. Burtt Davy, in the compilation of part of the "*Manual of the Flowering Plants and Ferns of the Transvaal*." In 1925 he was selected by the Director of Game Preservation, Tanganyika Territory, Mr. C. F. M. Swynnerton, as District Reclamation Officer in the Tsetse Research branch of the Game Preservation Department. Later when Mr. Swynnerton became Director of Tsetse Research, Burtt became Botanist in his Department, a post which he held until his death.

Burt's great love of natural history and keen powers of observation made him admirably suited for the ecological survey duties he was to perform. His experience at Kew had made him realize the necessity for the collection of complete and well-dried material in order that the constituents of the vegetations he was studying might be accurately determined. With this end in view, Burtt collected fine specimens, pressed and dried them admirably and supplied most comprehensive field notes. The more difficult

the group, the more attention it received from Burt. For instance the abundant material which he collected of the ecologically important genus, *Commiphora* Jacq., enabled him, whilst at Kew during a period of leave, to work out the taxonomy of the species found in Tanganyika, a research which resulted in the publication of "Observations on the genus *Commiphora*, and its distribution in Tanganyika Territory,"* a paper which included a most useful field key to the commoner species, descriptions of several new species and many reductions to synonymy. Other complex and important genera which Burt collected intensively are *Acacia* Willd., *Aloë* L., *Brachystegia* Benth., *Combretum* Loebl., and *Monotes* A. DC., his gatherings of which run into several hundred numbers, and will be a great help towards the ultimate revisions of these genera.

A considerable number of new species have been described from Burt's collections, many of them having the epithet *Burtii*, whilst a most beautiful Connaraceous shrub with flowers resembling cherry blossom, an important constituent of the Itegi thicket vegetation of central Tanganyika Territory, is most fittingly dedicated to its collector and bears the name *Burtia prunoides* Bak. f. et Exell.† Many more species collected by Burt remain to be described in years to come, for almost every genus of East African plants at Kew is enriched by some of his specimens.

More important, perhaps, than Burt's discovery of new species was his re-collecting of hitherto rare or imperfectly known species, his fine specimens of which have enabled their taxonomic position to be accurately ascertained. He also added to our British herbaria many species which previously had been represented only on the Continent.

A Fellow of the Royal Geographical Society, Burt was interested in the topography of tropical Africa especially in connexion with vegetation and plant-distribution. He used to spend many months of his leave travelling and exploring places other than those associated with his work. In 1930 he visited the Virunga Mountains and climbed all the eight principal peaks, at the same time making a fine collection of plants. A description of this expedition, with special reference to the mountain vegetation, was published by him in 1934.‡ On other occasions he explored the little-known mountains of northern Tanganyika collecting much useful material on each occasion. Quite recently Burt was sent on a mission to Nyasaland to investigate the spread of tsetse-fly in that territory. Travelling from Shinyanga by road, Burt passed through Abercorn in Northern Rhodesia and through country in which Carson had collected towards the end of last century. The prodigious collection Burt made on this journey resulted in the

* Kew Bull. 1935, 101-117.

† Journ. Bot. Brit. For. **69**, 249 (1931).

‡ Kew Bull. 1934, 145-165.

rediscovery of many species, known only from Carson's specimens. Shortly before his death, Burttt had curtailed his leave in England in order to return to his base at Shinyanga, Tanganyika Territory, by road from Nigeria, a route which led him through very varied country. A graphic account of this journey was contained in one of the last letters received from Burttt, which will be published elsewhere.

Burttt was a man of exceptionally fine physique and he possessed almost unflinching energy. Added to this he had a tremendous and infectious enthusiasm for his work, and a great capacity for endurance under the most exacting conditions. When it is remembered that a very large part of his 6500 odd gatherings of plants were collected, dried and annotated in his spare time, often after a hard day of trekking and surveying, it will be realized that few could have approached achievements such as his. Burttt possessed a charming personality, as is so often the case with great naturalists; he was large-hearted and generous, very fond of children and a lover of animals. Of his native servants he used to speak with real affection, and their length of service with him is a sure sign of their devotion to their master. One native "boy" who used to help Burttt write up his labels, had copied his handwriting so faithfully that the two hands are difficult to distinguish.

Burttt's loss will be keenly felt not only in the small community of fellow workers at Shinyanga, but by all those who were privileged to know him. Tsetse-fly research and African field botany are robbed of a great contributor, Kew of an enthusiastic collector of the highest rank, and those who knew him well of a lovable friend and charming companion.

E. MILNE-REDHEAD

HENRY NILUS THOMPSON.—We record with great regret the death on 9th July of Mr. H. N. Thompson, C.M.G., late Director of Forests, Nigeria. We are indebted to Captain W. A. Ross, C.M.G., and Mr. J. R. Ainslie for the following notes on Mr. Thompson's life and work.

In the death of Henry Nilus Thompson, C.M.G., the world has lost a great authority on the Flora and Fauna of Tropical Africa, and his friends a very generous and lovable man.

He was the son of R. H. Thompson of the Indian Forest Service and was born in Burma, where as a child he was rescued from a leopard which had entered his parents' tent in the forest. He was educated at Cooper's Hill and in Germany, and in 1889 he joined the Forestry Department of Burma. He was appointed to Southern Nigeria in 1902 and in 1906 became Director of Forests and Agriculture in the Amalgamated Southern Nigeria. In 1914 he was promoted Director of Forests for the whole of Nigeria, retiring in 1929.

"Timber" Thompson, as he was affectionately and widely known, was a great student and a very versatile man. He was a first-class shot, but he enjoyed more watching and studying elephants and other game both big and small at close quarters. In Nigeria he made long tours exploring the timber resources of the Colony. He had a wonderful memory and power of observation and his reports were full of discovery. Unfortunately he could not be prevailed upon in later days to record the unique knowledge of which his numerous treatise and reports contained but a tithe. He knew intimately the habits of the big and small game, the birds and insects, to say nothing of the flora. His earlier bulletins from the botanical station at Olokemeji contained prints of exquisite paintings of pests and flowers done under the microscope. Two new species, *Guarea Thompsonii* and *Landolphia Thompsonii*, were named in his honour. He was the most modest of men and it was only when with great friends that he uncovered a corner of his storehouse of knowledge on innumerable subjects.

He was a keen musician and no mean performer on the violin, banjo and piano, so that it was a joy to dine with him and have a musical evening. He was never idle. In spite of his eighteen stone he was untiring as a walker. When others slept he amused himself with Einstein or some scientific work in German, French or English.

He was devoted to the interests of the people and it was due to his influence that vast areas of forest were preserved by and for the natives without any friction or antagonism. In this he was wise in reserving to the native administrations the revenue and responsibility under his benign guidance.

So great was his love of Nigeria that he remained on retirement in the little forest home at Ibadan where, surrounded by his books, microscopes and an armoury of rifles, he was sought by subaltern and Governor and beloved by all who knew him.

When health failed, he had to come home for an operation, but he retained his steward and house in Ibadan and always cherished the hope that he might return and devote the remainder of his years to scientific investigation and to the enjoyment of the wonderful country that grips most men who are fortunate enough to serve there.

Thompson was also instrumental in establishing the administrations of the Botanic Garden at Victoria, Cameroons, on a proper basis. In a memorandum to the Government of Nigeria in 1925, he strongly supported the proposals I put forward after my visit to the Cameroons in 1921, and the scheme which was subsequently adopted owed much to his advocacy. A. W. H.

ALEXANDER ZAHLBRUCKNER.—We regret to record the death in Vienna of the eminent lichenologist Dr. Alexander Zahlbruckner. He died on the 8th May in his 78th year.

Zahlbruckner was born in St. Georgen near Pressburg, and after preliminary schooling in his native town he studied under Professor Wiesner at the University of Vienna. Having graduated as Doctor of Philosophy at the age of 23, he went to work under Beck-Mannagetta in the Vienna Natural History Museum. His promotion was rapid and when in 1899 Beck was appointed to the University of Prague, Zahlbruckner succeeded him as Keeper of the Botanical Section of the Museum. In 1918 he became its first director.

Lichen studies were among his first publications, and they were his chief interest for the rest of his life. Nevertheless he had a number of phanerogamic works to his credit, such as the account of the Penther collection of South African plants and his systematic studies of *Lobeliaceae*. Zahlbruckner seized every opportunity for travel, making himself acquainted with all important European herbaria. Working assiduously on lichen collections from all parts of the world, he published an important series of papers beginning about 1890, and as a result of these painstaking researches there appeared in Engler and Prantl's "Die Natürlichen Pflanzenfamilien" a modern system of lichen classification, now used as the basis of all systematic work on this group of plants. We are indebted to Zahlbruckner for the "Catalogus Lichenum Universalis," an outstanding work of reference started in 1921 and completed in 1934, and also for the very useful lichen bibliography in "Just's Botanischer Jahresbericht," which he produced with unfailing regularity from 1887 to the time of his death. Amidst these multifarious activities he yet found time in the last few years of his life to edit the second edition of "Rabenhorst's Kryptogamenflora von Deutschland, Oesterreich und der Schweiz."

Zahlbruckner had an astonishing capacity for work, and a pleasing personality, so that in every way his death is a very great loss to the botanical world.

C. I. DICKINSON.

ROBERT SELBY HOLE.—It is with great regret that we record the death of Mr. R. S. Hole, C.I.E., F.C.H., F.L.S., in his 64th year on the 28th June, 1938. He was the son of the late Rev. Robert Hole and a relative of the famous Dean Hole. He was educated at Clifton College and at the Royal Indian Engineering College, into which he passed at the head of the list of probationers for the Indian Forest Service in 1893. After a successful scholastic career he passed out first of his year and was awarded the Fellowship of the College. He joined the Indian Forest Service in 1896, as Assistant Conservator of Forests in the Central Provinces. Having had the benefit of Professor Marshall Ward's teaching at Cooper's Hill, he soon showed his proficiency in botanical science and in 1904 was posted as Instructor to the Forest School at Dehra Dun. In May 1907 he succeeded Mr. H. H. Haines as Imperial Forest Botanist at the Forest Research Institute and held that post

until his retirement in 1925. His services were recognized by the Government by the award of the C.I.E. in 1919. He officiated for a short time as President of the Forest Research Institute and College in 1913 and was elected President of the Botanical Section of the Indian Science Congress in 1918. During his service in India he kept in touch with Kew and many botanical specimens sent by him are housed in the Kew Herbarium.

He had a wide outlook on scientific subjects, especially in connexion with forestry, and contributed a number of papers to the "Indian Forester" and other journals. He originated in India the effort to collate the ground flora with the quality of the soil as an index to its forest potentiality. Perhaps his best piece of work was that "On some Indian forest grasses and their oecology" published in 1911 as part I, vol. I of the "Indian Forest Memoirs." He also compiled "A Manual of Botany for Indian Forest Students," published in 1909, being the expanded text of his lectures at the Forest College at Dehra Dun.

His wife, the daughter of General B. P. Rooke, M.D., survives him and to her we extend our sympathy.

C. E. C. FISCHER.

Botanical Monkeys.—In the Annual Report for 1937 of the Director of Gardens, Straits Settlements, an account is given by Mr. E. J. H. Corner, Acting Director of the Singapore Gardens, of the training of berok-monkeys (*Macacus nemestrina*) for the collecting of botanical specimens from high trees. The berok is the coconut or pig-tailed monkey which is widely used in the East by Malays for gathering coconuts.

The first monkey to be trained was Merah, obtained in April 1937 from Kelantan by Mr. Corner. Unfortunately Merah died after five months' work and the present team consists of two young beroks, Jambul and Puteh, who are both shaping well, though not yet as clever as Merah.

These monkeys understand twelve words of Kelantanese (Merah knew eighteen), and have been trained, in answer to the various commands, to pick specific twigs, drop them to the ground, descend and finally place them into the hands of the botanist. If the string to which they are attached becomes tangled they can untie almost any type of knot. Mr. Corner, in his report, says: "A berok upon the shoulder can be likened, in effect, to a falcon on the wrist; and its employment is recommended both to amateurs for its charm and cheapness and to keepers of Reserves where it is desirable to collect specimens repeatedly from the same trees without damage to them." He adds that Jambul and Puteh are to be congratulated on being the first apes to enter Government Service.

Contributions to the Flora of Borneo, etc. : V : a correction.—Dr. H. J. Lam, who kindly identified the *Sapotaceae* collected by the Oxford University Expedition to Sarawak in 1932 (see K.B. 1936,

17), authorises me to publish a correction to one of the numbers. The record of "*Palaequium* sp. aff. *P. rivulari* H. J. Lam" (l.c. 18), based upon *Richards* 1107, must be deleted, as a recent re-examination of the material at Kew has shown it to be a species of *Knema* (*Myristicaceae*), probably *K. glauca* (Bl.) Warb. I should point out that I was originally responsible for sending this specimen to Dr. Lam as a supposed *Sapotacea*, being at that time without experience of the Malayan flora.

H. K. AIRY-SHAW.

Herbals.*—The first edition of Dr. Agnes Arber's book on Herbals appeared just over a quarter of a century ago, and has long been out of print. The second edition, which appeared in May of this year, will be welcomed by all who are interested in the subject. Starting with a chapter on the Early History of Botany, the author deals successively with the Earliest Printed Herbals (Fifteenth Century), the Early History of the Herbal in England, and the Botanical Renaissance of the Sixteenth and Seventeenth Centuries. Then follow chapters on the Evolution of the Art of Plant Description, the Evolution of Plant Classification, the Evolution of the Art of Botanical Illustration, and the Doctrine of Signatures and Astrological Botany. A ninth chapter summarizes the author's conclusions. "Perhaps the most obvious of these is the incalculable debt which botany owes to medicine. An overwhelming majority of the herbalists were physicians, who were led to the study of botany on account of its connexion with the art of healing Second only to the debt of botany to medicine is its debt to certain branches of the arts, especially printing and wood-engraving. . . . The draughtsman and engraver, indeed, did more than merely disseminate existing knowledge; they lent the botanist their acute and highly trained powers of observation, and their work must often have revealed to him much that, without their help, he would never have seen."

The most active life-period of the printed herbal covered about two centuries, from 1470 to 1670, the finest period falling between 1530 and 1614, that is, between the woodcuts after Hans Weiditz in Brunfels's "*Herbarum Vivae Eicones*," and the copperplates of Crispian de Passe in his "*Hortus Floridus*." Artistically, plant illustration culminated in the woodcuts in Fuchs's herbals, and scientifically, in those of Gesner published in works by Camerarius the Younger. Classification, nomenclature and description, on the other hand, reached their high-water mark in the "*Prodromos*" (1620) and the "*Pinax*" (1623) of Gaspard Bauhin. As time went on, the *herbal*, with its characteristic mixture of medical and botanical lore, was superseded by the exclusively medical

* "*Herbals, their origin and evolution: a chapter in the history of botany, 1470-1670*" by Agnes Arber, M.A., D.Sc., F.L.S. A new edition, re-written and enlarged. Cambridge, at the University Press, 1938. Pp. xxiv + 326, frontispiece and 26 plates. 131 text-figures. Price 21s. net.

pharmacopoeia, on the one hand, and the exclusively botanical *flora* on the other.

Compared with the first edition, the new one has 73 more pages, 5 more plates, and 18 additional text-figures. There are new sections on the Herbal in Spain and Portugal (pp. 104-110), and the Origin of Herbaria (pp. 138-143). The three appendices are not the least useful part of the book. The first consists of a chronological index of the principal herbals published between 1470 and 1670, the second is an alphabetical list, under authors' names, of works consulted, while the third is a subject index to Appendix II.

Those familiar with the first edition need no reminder of the charming style in which the work is written. Few authors wear their mantle of learning with such grace. It only remains to add that the printing and illustrations maintain the high standard of the Cambridge University Press.

T. A. SPRAGUE.

Pulle's Compendium.*—Professor Pulle's handbook consists of three parts, dealing respectively with the morphological terminology, the nomenclature, and the taxonomy of seed plants. The first part (pp. 1-70) is based on the late Professor J. W. Moll's "Handboek der Plantbeschrijving," of which three editions were published, in 1900, 1911 and 1916 respectively, but has been revised and considerably modified by Dr. H. Uittien. It is arranged under 112 numbered divisions, the first two forming a synopsis of the whole, and the remaining 110 being concerned with the subjects added here in brackets: nos. 3-27 (leaf); 28-38 (stem); 39-41 (root); 42-44 (buds); 45-49 (bulbs and tubers); 50 (tendrils); 51 (spines); 52 (ascidia and utriculi); 53 (lenticels, prickles, rammenta, scales and hairs); 54-56 (inflorescence); 57-103 (flower); 104-105 (fruit); 106-112 (seed).

The treatment of the inflorescence does not follow the stereotyped classification used in most textbooks, the primary division adopted being into inflorescences with sessile, and those with stalked flowers; this results in a mingling of racemose and cymose types, but may perhaps be convenient for the student. It is doubtful whether anything is gained, however, by the segregation of the dichasial panicle (seen in *Ligustrum* and *Buddleja*) from the thyrses; the latter is a general and useful term for any racemose arrangement of cymes.

The figures illustrating the various kinds of aestivation show only three of the four imbricate types occurring in pentamerous whorls, namely, contorted, quincuncial and apotactous (termed "cochlear" in the handbook). The paratactous type (see Journ. Bot. 1923, 210) is unrepresented.

The second part (pp. 71-127) of the handbook, dealing with nomenclature, is a distinct and commendable innovation in a work

* Compendium van de Terminologie, Nomenclatuur en Systematiek der Zaadplanten door Dr. A. A. Pulle. Utrecht, bij N.V.A. Oosthoek's Uitgevers-Maatschappij, 1938. Small 8vo. Pp. 338, 1 pl. Price Fl. 4.50.

of this type. Within the compass of 66 small pages Professor Pulle has given a digest of the more important provisions of the International Rules of Botanical Nomenclature. He points out the difficulties which the subject offers to the average botanist, and has given a clear account of the principal rules and recommendations. Starting with the necessity for a generally accepted international scientific nomenclature of plants, the book deals successively with synonyms, homonyms, categories of taxonomic groups and the terms denoting them, spelling and gender of names, valid publication, legitimate and illegitimate names, citation of authors' names, retention of names on division of groups, the rule of priority, nomina conservanda, starting-points of recognised botanical nomenclature, and the type-method. Then follow sections including examples of application of the Rules, the nomenclature of cultivated plants, and a synopsis of the headings under which the Rules are arranged.

The statement (p. 106) that *Cladium* [P. Br., 1756] is replaced by *Mariscus* [Zinn, 1757] under the Rules is open to question. Reasons for regarding *Cladium* P. Br. (1756) as validly published have been given in Kew Bull. 1934, 218. In any case it has recently been decided by the Special Committee for Phanerogamae and Pteridophyta that *Mariscus* Gaertn. (1788) should be conserved against *Mariscus* Zinn (1757), so that the latter name is unavailable for the genus concerned. The generic name *Neslia* Desv. (1814) cannot (as stated on p. 106) be replaced under the Rules by *Vogelia* Medik. (1792), since the latter is a later homonym of *Vogelia* J. F. Gmel. (1791).

The third part of the book (pp. 129-338) consists of concise descriptions of the Orders and Families of Seed-plants, accompanied by very clear floral diagrams. The classification is mainly in accordance with Engler-Diels' Syllabus, modified by the transposition of various groups to other parts of the system. A new subdivision, *Chlamydospermae*, is proposed for the reception of the Orders *Gnetales* and *Welwitschiales*, formerly included in the *Gymnospermae*. Perhaps the most novel feature, however, is the division of the *Metachlamydeae* (*Sympetalae*, *Gamopetalae*) into five groups, each of the first four being attached to a separate series of *Archichlamydeae*. Thus the Orders *Plumbaginales* and *Primulales* are placed after the *Centrospermae*, *Polygonales* and *Cactales*; the *Ebenales* follow the *Ranales*; the *Diapensiales*, *Ericales* and *Campanulatae* are appended to the *Guttiferales*; and the *Rubiales* succeed the *Celastrales* and *Umbelliflorae*. The position assigned to the *Campanulatae* is very questionable, but there is much to be said for the other changes mentioned, some of which embody suggestions contained in the Übersicht der Reihen der Angiospermen in Wettstein's Handbuch der Systematischen Botanik. The old group of the *Bicarpellatae* remains practically unaltered, except that the *Callitrichales* and *Hippuridales* have been appended to it.

It may be pointed out that the Family *Diclidantheraceae* should be deleted, it having been pointed out in 1932 (Hook. Ic. Pl. t. 3172) that *Diclidanthera* and the closely related genus *Barnhartia* are both referable to the *Polygalaceae*.

Professor Pulle's handbook should do much to stimulate interest in the Netherlands both in botanical nomenclature and in the classification of the Seed-plants. A similar book, written in English, would be welcome.

T. A. SPRAGUE.

A Bibliography of Eastern Asiatic Botany.*—Workers on the flora of China and Japan have been placed in an enviable position by the publication of this impressive Bibliography by Drs. Merrill and Walker. From the point of view of access to the literature of their subject, botanists concerned with this area have now an immense advantage over most of their colleagues.

The bibliography proper (authors and titles) occupies 550 pages, double column. The feature that immediately commends itself is the brief paragraph after each item, indicating or summarising its contents: obviously this greatly enhances the value of the bibliography. Titles of periodicals are abbreviated as shown in the reference list occupying preliminary pages xiii-xlii.

An appendix (pp. 551-592) gives "Older Oriental Works," "Reference Lists of Oriental Serials" and "Reference Lists of Oriental Authors," separate sections being devoted to Chinese and Japanese entries in each case.

The subject index, stated to be mainly the work of the junior author, is arranged under three headings: first, a general index of subjects; second, a geographic index, arranged under 4 main (political) Regions, and other subdivisions, to which a key-map is provided on p. 594 (a useful key-map to the prefectures and provinces of Japan is also given on p. 618); third, a systematic index, the major categories being arranged according to the Engler-Diels "Syllabus" (ed. 11, 1936), while families, genera and species are indexed alphabetically under each major group.

One can have nothing but praise for this work. Typography and lay-out are exceptionally clear, paper and binding are good, and the volume is comfortable to handle and opens flat. Only two misprints have been noted: "catologues," p. ix, l. 17, and "AMENOTAXACEAE," p. 645. Some idea of the labour involved in, and of the care expended on, this work may be gathered from the preface and introduction. There can be no doubt that the authors' hope "that the work will be a real aid to that wide group

* By Elmer D. Merrill and Egbert H. Walker. Sponsored by the Smithsonian Institution, Arnold Arboretum of Harvard University, New York Botanical Garden, Harvard-Yenching Institute. The Arnold Arboretum of Harvard University, Jamaica Plain, Mass., U.S.A., 1938. Pp. xlii+719. Two maps. Price \$50.

of botanists interested in the study of the rich and varied flora of Eastern Asia " (p. viii) will be amply fulfilled.

It would be ungracious to close without noting that publication was finally rendered possible through the generosity of an anonymous supporter, to whom, therefore, botanists in this field owe a special debt of thanks.

H. K. AIRY-SHAW.

Botanical Magazine.—Part I of vol. 161 was published on April 8th, 1938. It contains the following plant portraits :—

Meconopsis superba King ex Prain (t.9513), the handsome white-flowered species found in the Chumbi District, Tibet, and in Western Bhutan ; $\times$ *Cistus Skanbergii* Lojac. (t.9514), originally described by Lojaccono as a species but now considered to be a natural hybrid between *C. monspeliensis* and *C. parviflorus* occurring in the island of Lampedusa, and in Greece ; *Crocus laevigatus* Bory & Chaubard (t.9515), from the Cyclades, Euboea, Attica and N. Peloponnese ; *Gaultheria Wardii* Marquand & Airy Shaw (t.9516), a fine purple-fruited species found in S. E. Tibet, N. E. Assam and N. W. Upper Burma ; *Lonicera splendida* Boiss. (t.9517), native of S. Spain ; *Linaria ventricosa* Coss. & Bal. (t.9518), distributed in S. W. Morocco ; *Prunus (Cerasus) dawyckensis* Sealy (t.9519), a new species or possibly a hybrid, probably Chinese, but known only in cultivation in Lt. Col. F. R. S. Balfour's garden at Dawyck, Stobo, Scotland ; *Cypripedium japonicum* Thunberg (9520), described in 1784, a native of Japan and China ; *Rhododendron phoenicodon* Balf. f. & Farrer (t.9521), from N. E. Burma ; *Gladiolus Stanfordiae* L. Bolus (t.9522), a beautiful pale-pink-flowered species from the Eastern Province, South Africa, and *Myrtus Lechleriana* (Miquel) Sealy, comb. nov. (t.9523) originally described as *Myrcia Lechleriana* by Miquel, one of several Chilean plants known as " Luma," native of Southern Chile and Western Argentina.

The Alpine House.*—There are a number of books available devoted to the Rock Garden, but none has been published dealing exclusively with the Alpine House. The present volume by Stuart Boothman, therefore, fills an obvious need.

The book is written in such a way that even the most inexperienced alpine grower can follow it, and the advice given, being both practical and sound, will be helpful to all. A little more space might have been given to plunging beds and frames, as these are essential if display is not to be restricted. Some plants have quite a short flowering period, while most of our alpine enjoy the open air if not the full light and do not appreciate being kept in the house most of the year. A rock garden built under glass is not often a success.

* By Stuart Boothman. Rush and Warwick (Bedford) Ltd. 1938. Pp. 131. Illustrated. Price 5s.

Quite a good list of plants is given, but they have perhaps been selected for the specialist rather than for general purposes. All are certainly worthy of a place, but, apart from bulbs and saxifrages, they mainly cover only the months of May, June and July, while quite a number of well-known and easily grown plants have been omitted. These are often hardy on the rock garden, but that does not bar them from the alpine house.

Special attention is given to campanulas. These are undoubtedly a very beautiful group of plants, but other genera, equally attractive, might have been given more space, instead of devoting many pages to one genus.

Greater care might have been given to the orthography of names. The same specific epithet is frequently spelt in two ways on different pages, e.g., *Lupinus Lyalli* on p. 85, and *Lupinus Lyallii* on p. 121, etc. The use of the capital initial letter in specific epithets appears to cause difficulty. According to Recommendation 43 of the International Rules of Nomenclature (as amended at Amsterdam in 1935) "Specific (or other) epithets should be written with a small initial letter, except those which are derived from names of persons (substantives or adjectives) or are taken from generic or vernacular names (substantives or adjectives)." In such names, therefore, as *Veronica bombycina* on p. 104; *Iris histrioides* on p. 108, the specific epithet should be written with the small initial letter, whereas it should be *Rhodothamnus Chamaecistus* on p. 110; *Cypripedium Calceolus* on p. 70 and *Andromeda Polifolia* (not *polyfolia*) on p. 110. Although *Saxifraga Grisebachii* comes from the Balkans, the Wisley variety (p. 98), sometimes known as *Wisleyana*, can hardly claim that part of the world for its habitat. A number of other similar mistakes could be quoted, and it is hoped that they will be corrected in a future edition is called for.

These small technical errors do not detract greatly from the value of the book. Both the beginner and those who already have an alpine house, whether they are amateurs or professionals, will find much useful information in its pages. G. H. PRESTON.

A Flora of Assam.*—The second volume of this work includes the 21 families from the *Connaraceae* to the *Cornaceae* (both included), following the sequence of the "Genera Plantarum." The two parts of volume I were reviewed in Kew Bull. 1935, 586, and 1937, 528 respectively, and certain shortcomings were stressed. The present volume is a distinct improvement; there are fewer omissions and far more pains have been taken to ensure modern nomenclature. Further, a larger, clearer and more pleasing type has been used.

A retired Forest Officer, Mr. A. Das, has been entrusted with the final duty of revision, but it is to be regretted that, owing to financial considerations, he has not been able to consult the Herbarium

* By U. N. Kanjilal, P. C. Kanjilal and A. Das. Vol. II. The Prabasi Press, Calcutta, 1938. Pp. v + 409. Price 12 Rs.

and Library at Sibpur in person. As he remarks : " It is impossible to do justice to a work of this nature without facilities for ready reference." Mr. Das, however, has been in communication with Kew and Sibpur and acknowledges the help extended to him.

C. E. C. FISCHER.

The Black Poplars.*—The numerous kinds of black poplar in cultivation have been a source of trouble to botanists and silviculturists alike for a long time. The task of identification has been very difficult owing to the great similarity in foliage and branch characters of many hybrids. The need for accurate identification was none the less urgent to the silviculturist, as closely related forms differ considerably in their resistance to disease. The publication of this workable key based on vegetative characters for the identification of the black poplars and their allies is assured of a widespread welcome.

The characters of the leaves and branches of value for identification are discussed and a key to the sections of the genus is given. Then follow excellent descriptions of the species, varieties and hybrids of the black poplar group that are both critical and concise. The key to the species and hybrids cultivated in Britain employs the vegetative characters discussed earlier in the work. It is simple to use except for a few cases in which the distinguishing characters cannot all be determined at one time. Thus $\times$ *Populus serotina* Hartig is separated from $\times$ *P. regenerata* Henry by the relative times of foliation, habit and sex.

It is regrettable that the nomenclature is not always in accordance with the International Rules of Botanical Nomenclature. Different binomial names are given to each of the cultivated segregates of the hybrid *P. nigra* L. $\times$ *P. deltoides* Marshall owing to a misinterpretation of Articles 31 and 34 of the Rules, which the author actually quotes in support of this practice. Article 31 explains the use of binomial names preceded by a symbol for hybrids, while Article 34 deals with different hybrid forms of the same parentage and states that "... the subdivisions are classed under the binary name of the hybrid like the subdivisions of a species under that of a species." In Article 31 it is stated that " The name, (which) is subject to the same rules as the names of species, . . ." and Article 28 contains the statement : " The use of a binary nomenclature for subdivisions of a species is not admissible." It is clear therefore that the rules relating to species are intended to be applied to hybrids also when practicable. Morphologically different hybrid segregates derived from one pair of species must, therefore, be classified as varieties or forms of the hybrid under one binomial. Which of the terms variety and form

*By A. S. Cansdale and members of the staff of the Imperial Forestry Institute. The University Press, Oxford, 1938. Pp. 52. Price 3s. 6d.

is used is immaterial to the point at issue; there is no generally accepted definition of either.

The book ends with a good bibliography.

Plants for the Connoisseur.*—Mr. T. Hay has been recognised for many years now as an enthusiastic collector and expert cultivator of new and rare plants. In this work he deals with nearly one hundred subjects, giving full cultural details and adequate descriptions. Aptly described as "Plants for the Connoisseur," some may not prove to be everybody's plants, but the author's introductions are rapidly becoming less uncommon in gardens owing to his generous distribution of seeds and plants to garden lovers throughout the British Isles.

The great value of this book, which is splendidly illustrated, lies in its stimulus to follow the author's lead and grow uncommon and rare plants. Details as to habitat and other historical data serve to increase its interest. The notes on the new additions to the genus *Meconopsis* are especially valuable and are accompanied by a number of excellent photographs of new species which, under Mr. Hay's care, have already flowered in Hyde Park.

The countries yielding the greatest number of Mr. Hay's subjects are those in the neighbourhood of the Himalayas, such as Nepal and Kashmir, but he has flung his net wide and South Africa, California, Chile, Canada, Mexico, and even such isolated places as the Pribylov Islands in the Bering Sea, are all represented.

W. M. CAMPBELL.

Cultivation of Plants without Soil.†—It is a well-known fact in botanical laboratories that many kinds of plants can be successfully cultivated in aqueous solutions of mineral salts, selected so as to provide a balanced supply of those elements which are necessary for plant growth. The method of growing plants in water culture has, in fact, been used for many years to demonstrate to students the effects on the growth of the plants which may be induced by the omission of one or more of the ingredients from the complete culture solution. Those who have attempted to cultivate plants under these conditions are only too familiar with the difficulties which arise unless the cultures are constantly supervised in order to ensure that the solutions are sufficiently aerated and the growth of fungi, algae and bacteria suppressed. In spite of these difficulties, the possibility of growing vegetables and flowers by modifications of these well-known laboratory methods has, in recent years, aroused considerable popular interest, especially in

* By T. Hay, C.B.O., V.M.H., Putnam, London, 1938. Pp. 180. Illustrated. Price 10s. 6d.

† "Soilless Growth of Plants," C. Ellis and M. W. Swaney. Reinhold Publishing Corporation, New York, 1938. Pp. 155, with 50 illustrations. Price 2.75 dollars (English price 13s. 6d.)

the United States of America. The system is also being used on a commercial scale in some places and it is understood that before long a hitherto barren island in the Pacific Ocean will become a port of call for aeroplanes in order to obtain supplies of fresh vegetables for the use of passengers. The vegetables are to be raised by soilless cultivation or "hydroponics"—a name which has been coined for this method of raising plants. Several manufacturers are now specialising in the supply of chemicals for "hydroponics" (*Chronica Botanica*, 4, 228 : 1938).

The economics of crop production are certainly curious in these days of output restrictions and the deliberate destruction of food supplies which are alleged to be superfluous. One is forced to wonder why, under the existing circumstances, the ingenuity of man has been turned to devise ways and means of cultivating plants by such artificial means as those of hydroponics, when modern transport and cold storage methods enable plant products produced by normal means to reach the four corners of the globe. No doubt the love of novelty, the desire to advertise, and commercial exploitation have provided the principal stimulus. However this may be, those who are attracted by hydroponics either as a hobby or from a desire to know something of its commercial possibilities, would be well advised to read this lucid, semi-popular account of the subject by Ellis and Swaney. The methods described range from the cultivation of single plants in jars in an ordinary sitting-room or small greenhouse, to large-scale methods which are stated to be suitable for commercial purposes. Besides methods in which the roots of the plants are immersed in culture solution, descriptions are given of systems whereby the roots are embedded in sand, cinders, or other suitable materials through which the solutions are allowed to percolate either continuously or intermittently. A student who is first introduced to the physiology of plants by the first chapter of this book would be very unlikely to obtain good marks in an academic examination unless his views were balanced by reading a more orthodox exposition of the subject as well. The authors also tend to be rather sensational in chapter 6 where the influence on plants which may be exerted by hormones, heavy water, photosensitizing dyes, colchicine and other substances which have recently come into prominence is discussed. On p. 140 the authors do not clearly differentiate between algae and fungi. These defects are not very important, however, in a book which is intended primarily for popular rather than academic consumption. Most readers will probably find the book interesting, whilst to others it may be provocative, but it may be perused with advantage by all who are interested in plant cultivation. C. R. METCALFE.

The Cultivation of Mushrooms.*—This is a revised and enlarged edition, incorporating the results of recent investigations, of a useful little handbook first published in 1934. Detailed descriptions and figures are given of methods of cultivation of mushrooms on a commercial scale including a working description of the shelf method. There is a chapter on diseases and pests, the arrangement of which is rather haphazard. Fungi which attack the mushroom itself are mixed in no obvious order with those which are injurious only as competitors in the beds. Among the invaders of mushroom beds there is no mention of either *Clitocybe dealbata* or *Clitopilus cretatus*, both of which have been described as occasionally causing considerable trouble. This chapter concludes with a general dissertation on control measures for diseases, pests and other contaminations. At the end of the book, some recipes for cooking mushrooms are included, supplied by the Editor of "Good Housekeeping."

E. M. WAKEFIELD.

Laboratory Guide for Elementary Botany Students.†—This book contains practical directions intended for a year's course in elementary botany designed for students at the University of California. The instructions are clearly presented, and the course would be quite suitable for general use in schools and other institutions where instruction in elementary botany is given. The only mistakes noted are on p. 65 where the spelling of *Berberis*, *Althaea*, and *Agaricus* is incorrect.

* By W. F. Bewley and J. Harnett. Anglo-Scottish Press, Ltd., London, 1938. Pp. 95, figs. 30. Price 3s. 6d. net.

† "A Laboratory Guide for a Course in General Botany." By L. Bonar, L. Roush and R. M. Holman. Fourth edition. John Wiley and Sons Inc., New York. Chapman and Hall Ltd., London. 1938. Pp. xii + 110. Price 6s.

Printed under the authority of HIS MAJESTY'S STATIONERY OFFICE
By the South Essex Recorders, Ltd., Ilford.

(1359) Wt. 17/32 800 9/38 S.E.R. Ltd. Gp. 381